C21.5: 954/2

Vol. 954 Number 2

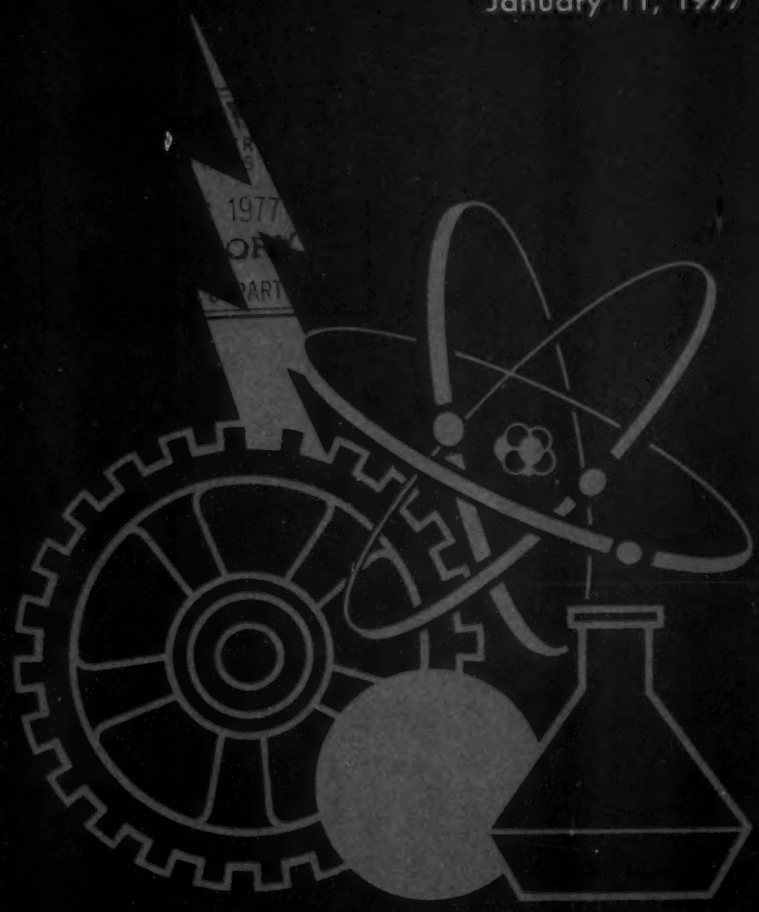
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

January 11, 1977



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OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

January 11, 1977 Volume 954 Number 2

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PATENT AND TRADEMARK OFFICE NOTICES

Order

John W. Kraft of Boise, Idaho, whose registration number is 24,701, is hereby excluded from further practice before the Patent and Trademark Office until March 31, 1981, when he will become eligible for reinstatement as an attorney in Idaho. On or after that date, he may be reinstated here upon submission of a satisfactory showing (1) that he is entitled to reinstatement as an attorney in Idaho, pursuant to the terms set forth in an order of the Supreme Court of the State of Idaho dated September 27, 1976 (Supreme Court No. 12182), and (2) that he is then qualified for registration under 37 C.F.R. 1.341.

This action is taken under the provisions of 35 U.S.C. 32.

Dec. 16, 1976. LUTRELLE F. PARKER,
Deputy of Commissioner of Patents and Trademarks.

Practice Re: Applications Involving Computer Programs

On November 18, 1976, the Court of Customs and Patent Appeals decided the cases of *In re Noll* and *In re Chatfield*. In both cases the Board of Appeals had taken the position that the claims were drawn to non-statutory subject matter under the Supreme Court's decision in *Gottschalk* v. *Benson*, 409 U.S. 63, 175 USPQ 673 (1972). The Noll application claims were drawn to an apparatus and the Chatfield application claims were drawn to a method.

The CCPA reversed the Board of Appeals in both cases. Until these decisions become final and since further review or clarification may be forthcoming, the patent examining corps will continue to examine computer programming applications in accordance with its current interpretation of the Supreme Court decision in the Benson case.

Prosecution will be resumed on all applications previously suspended under 37 CFR 1.103(b). No further programming applications will be suspended at the instance of the Office.

C. MARSHALL DANN,
Dec. 14, 1976. *Commissioner of Patents and Trademarks.*

Patent and Trademark Office Advisory Committee

Notice of Meeting

The Patent and Trademark Office Advisory Committee will meet from 10:00 a.m. to 5 p.m. on February 4, 1977, in Room 3–11C28 (Commissioner's Conference Room), Patent and Trademark Office, Crystal Plaza Building 3, Arlington, Virginia. This committee was established on December 15, 1975 to advise the Patent and Trademark Office on matters concerning the patent system and the administration of the Office. The agenda for the February 4 meeting is:

(1) Status report on Patent and Trademark Office studies and activities concerning topics previously considered by the Committee.
(2) Further consideration of a system of reexamination of issued patents, including a draft recommendation on this subject.
(3) Problems of the independent inventor and small business patentee.

The meeting will be open to public observation; approximately 15 seats will be available for the public on a first-come first-served basis. A period will be set aside for oral comments or questions by public observers of 3 minutes per individual on each of the agenda items. More extensive comments or questions should be submitted in writing before February 2. Other public statements may be submitted at any time before or after the meeting.

Copies of the minutes will be available on request 45 days after the meeting.

Inquiries may be addressed to the Committee Control Officer, Herbert C. Wamsley, Office of the Commissioner of Patents and Trademarks, Washington, D.C. 20231, telephone: 703–557–3071; or to the Executive Secretary, David B. Allen, Office of Legislation and International Affairs, Patent and Trademark Office, Washington, D.C. 20231, telephone: 703–557–3065.

Dec. 20, 1976. C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

Approved:

BETSY ANCKER-JOHNSON, PH. D.
Assistant Secretary for Science and Technology.

PATENT NOTICES

Certificates of Correction for the Week of Jan. 11, 1977

D. 236,800	3,957,017	3,975,542	3,988,206
D. 241,244	3,960,006	3,975,543	3,988,502
3,425,155	3,960,858	3,976,196	3,989,019
3,493,685	3,962,119	3,976,430	3,989,076
3,589,426	3,962,398	3,976,570	3,989,115
3,620,294	3,963,726	3,976,885	3,989,154
3,681,910	3,964,090	3,977,160	3,989,220
3,717,433	3,964,730	3,979,174	3,989,302
3,726,825	3,965,118	3,979,323	3,989,420
3,731,166	3,965,126	3,980,123	3,989,423
3,734,889	3,965,241	3,980,723	3,989,470
3,736,013	3,966,701	3,980,784	3,989,545
3,743,077	3,966,738	3,980,794	3,989,693
3,748,636	3,966,755	3,981,048	3,989,697
3,750,877	3,967,714	3,981,335	3,989,981
3,758,456	3,968,034	3,982,205	3,990,087
3,763,404	3,968,212	3,982,342	3,990,115
3,799,002	3,969,765	3,982,496	3,990,141
3,847,854	3,970,414	3,982,898	3,990,151
3,848,109	3,970,468	3,983,621	3,990,295
3,861,607	3,970,799	3,983,920	3,990,313
3,903,032	3,971,378	3,984,141	3,990,511
3,912,195	3,971,974	3,984,340	3,990,532
3,920,280	3,972,312	3,984,411	3,990,636
3,920,625	3,972,694	3,984,729	3,990,702
3,935,478	3,972,867	3,986,254	3,990,910
3,938,297	3,974,161	3,986,343	3,990,912
3,940,169	3,974,307	3,986,920	3,991,887
3,944,008	3,974,426	3,986,986	3,992,037
3,948,357	3,974,955	3,987,232	3,992,200
3,949,755	3,975,122	3,987,679	3,992,550
3,951,047	3,975,399	3,987,722	3,992,658
3,956,164	3,975,407	3,987,891	

Availability of Booklet on Significant Patents and Inventors

A commemorative booklet celebrating the Bicentennial, "Revolutionary Ideas—Patents and Progress in America," is now available. The booklet contains a list of numerous significant patents, with pertinent information on each, and coupons for ordering copies of these patents. Highlights of the listing include important inventions such as the Cotton Gin, the Telephone, and the Phonograph; well-known inventors such as Thomas A. Edison, Nikola Tesla, and Samuel F. B. Morse; famous individuals who were granted patents such as Abraham Lincoln and Samuel L. Clemens; and the official Bicentennial Patent. A brief narrative discusses the significance of the Patent System in the American and world economies. In the front of the booklet is a copy of the first patent grant in the United States, on parchment, suitable for framing. Copies of the booklet are available from the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402—stock number: 003–004–00537–8; price: $1.00 per copy.

SARA E. BJORGE,
Date: Dec. 14, 1976. *Director, Office of Management and Organization.*

Dedications

3,463,651.—*Rubin Warsager*, Newark, N.J. MULTICOLOR SURFACE DECORATION AND PROCESS FOR PRODUCING SAME. Patent dated Aug. 26, 1969. Dedication filed Nov. 11, 1976, by the inventor.

Hereby dedicates to the Public Claims 3, 6 and 7 of said patent.

3,738,952.—*Paul D. Kostenbader*, Bethlehem, Pa. METHOD FOR TREATING ACID WATER CONTAINING METALLIC VALUES. Patent dated June 12, 1973. Dedication filed June 1, 1976, by the assignee, *Bethlehem Steel Corporation.*

Hereby dedicates to the Public the entire remaining term of said patent.

Disclaimer and Dedication

3,499,107.—*Edward Emanuel Sheldon*, New York, N.Y. LIGHT TRANSFER DEVICES USING LIGHT CONDUCTING MEMBERS OF MULTILAYERED CONSTRUCTION AND PHOTOELECTRIC MEANS. Patent dated Mar. 3, 1970. Disclaimer and dedication filed Nov. 1, 1976, by the assignee, *American Optical Corporation.*

Hereby disclaims and dedicates to the Public the remaining term of said patent.

Errata

All reference to Patent No. 4,000,255 to Bernhard Guggenheim et al. of Switzerland for Mutanase appearing in the OFFICIAL GAZETTE of December 28, 1976 should be deleted since no patent was granted.

All reference to Patent No. 4,000,337 to Sieghard Neufeldt of Germany for Process and Agent for the Processing of Yarns appearing in the OFFICIAL GAZETTE of December 28, 1976 should be deleted since no patent was granted.

Disclaimers

3,463,651.—*Rubin Warsager*, Newark, N.J. MULTICOLOR SURFACE DECORATION AND PROCESS FOR PRODUCING SAME. Patent dated Aug. 26, 1969. Disclaimer filed Oct. 28, 1976, by the inventor.

Hereby enters this disclaimer to claims 1, 2, 4, 5, 8 and 9 of said patent.

3,586,463.—*Jean Charles Marchadour*, Quimper, France. FILLING AND METERING DEVICE FOR USE IN CANNING. Patent dated June 22, 1971. Disclaimer filed Oct. 12, 1976, by the inventor.

Hereby enters this disclaimer to claims 1 and 2 of said patent.

3,608,593.—*Samuel L. McCormick, Jr.* and *John J. Burke*, Indianapolis, and *Arthur R. Morstadt*, Speedway, Ind. METHOD OF FILLING POWDERS INTO CONTAINERS. Patent dated Sept. 28, 1971. Disclaimer filed Oct. 6, 1976, by the assignee, *Eli Lilly and Company.*

Hereby enters this disclaimer to all claims of said patent.

3,635,933.—*Robert J. Schaffhauser*, Brookside, and *Charles D. Mason*, Florham Park, N.J. 1,2-POLYBUTADIENE MOLDING COMPOSITION. Patent dated Jan. 18, 1972. Disclaimer filed July 29, 1976, by the assignee, *Allied Chemical Corporation.*

Hereby enters this disclaimer to all claims of said patent.

3,660,360.—*Dilip K. Ray-Chaudhuri* and *Carmine P. Iovine*, Somerset, N.J. WATER- AND OIL-REPELLENCY AGENTS. Patent dated May 2, 1972. Disclaimer filed Sept. 28, 1976, by the assignee, *National Starch and Chemical Corporation.*

Hereby enters this disclaimer to claims 1, 2 and 12 of said patent.

3,660,900.—*Lawrence F. Andrews*, La Jolla, Calif. METHOD AND APPARATUS FOR IMPROVED ORTHODONTIC BRACKET AND ARCH WIRE TECHNIQUE. Patent dated May 9, 1972. Disclaimer filed Oct. 27, 1976, by the assignee, *"A"-Company, Inc.*

The term of this patent subsequent to Nov. 11, 1986, has been disclaimed.

3,675,156.—*Hans Guenter Danielmeyer*, Matawan, N.J. LASER PUMP CAVITY WITH CONICAL GEOMETRY. Patent dated July 4, 1972. Disclaimer filed Oct. 12, 1976, by the assignee, *Bell Telephone Laboratories, Incorporated.*

Hereby enters this disclaimer to all claims of said patent.

3,697,346.—*Horace B. Van Dorn*, Kensington, *Richard J. Matt*, Simsbury, and *Thomas P. Rolland*, Bristol, Conn. METHOD OF MAKING A COMPOSITE PLASTIC BEARING. Patent dated Oct. 10, 1972. Disclaimer filed Oct. 18, 1976, by the assignee, *Textron Inc.*

Hereby enters this disclaimer to claims 1, 3, 4, 5, 11, 12, 14, and 17 of said patent.

3,717,549.—*Foy F. Roberts*, Stonington, Conn. FERMENTATION PROCESS FOR THE PRODUCTION OF CITRIC ACID. Patent dated Feb. 20, 1973. Disclaimer filed Oct. 22, 1976, by the assignee, *Pfizer Inc.*

Hereby enters this disclaimer to claims 1 through 7 of said patent.

3,776,961.—*Robert J. Theissen*, Westfield, N.J. 3-SUBSTITUTED 4-NITROPHENYL HALOPHENYL ETHERS. Patent dated Dec. 4, 1973. Disclaimer filed July 26, 1976, by the assignee, *Mobil Oil Corporation.*

Hereby enters this disclaimer to claims 1 and 3 of said patent.

3,843,933.—*Adel Abdel Azia Ahmed*, Annandale, N.J. CURRENT AMPLIFIER. Patent dated Oct. 22, 1974. Disclaimer filed Sept. 27, 1976, by the assignee, *RCA Corporation.*

Hereby enters this disclaimer to claims 1, 4, 5, 7, 8, 9, 10, 11, 12, 13 and 16 of said patent.

3,874,540.—*Walter E. Hidding*, Barrington Hills, Ill. TAMPERPROOF CAP. Patent dated Apr. 1, 1975. Disclaimer filed Nov. 18, 1976, by the inventor.

Hereby enters this dicslaimer to claims 2, 3 and 4 of said patent.

3,887,293.—*Bradshaw Bowman*, Carmel, Calif. METHOD FOR IMPRINTING NON-REPEATING STONE PATTERNS IN FRESH CONCRETE. Patent dated June 3, 1975. Disclaimer filed Nov. 19, 1976, by the assignee, *Bomanite Corporation.*

Hereby enters this disclaimer to claim 1 of said patent.

3,975,249.—*Philip Anthony Staniland*, Welwyn, and *Graham Jarrett*, Hitchin, England. AROMATIC POLYMERS OF INCREASED RESISTANCE TO FLOW AND MOLECULAR WEIGHT OBTAINED BY IRRADIATION. Patent dated Aug. 17, 1976. Disclaimer filed Nov. 1, 1976, by the assignee, *Imperial Chemical Industries Limited.*

The term of this patent subsequent to May 25, 1993, has been disclaimed.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF DECEMBER 4, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	2-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	3-30-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	11-11-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	2-11-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-5-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-12-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	2-3-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	12-4-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	6-4-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-14-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-10-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	1-22-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	5-3-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	12-23-75
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	5-2-76

Expiration of patents: The patents within the range of numbers indicated below expire during December 1976, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,914,768 to 2,919,442 inclusive
Plant Patents..... Numbers 1,882 to 1,892, inclusive

REISSUES

JANUARY 11, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

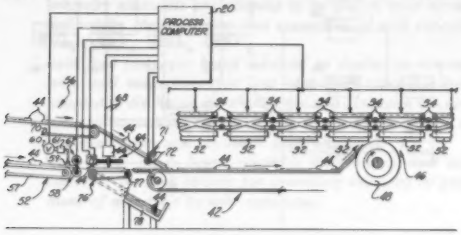
Re. 29,105
APPARATUS FOR MAKING BOOKS

Leonard Miaskoff, and David A. Reed, both of Easton, Pa., assignors to Harris Corporation, Cleveland, Ohio

Original No. 3,816,866, dated June 18, 1974, Ser. No. 357,608, May 7, 1973. Application for reissue Dec. 18, 1975, Ser. No. 642,178

Int. Cl.² B42C *11/00*

U.S. Cl. 11—3 **8 Claims**



6. An apparatus as set forth in claim [4] *5* further including third cover feed means for feeding covers which are different than the covers fed by said first and second cover feed means, said control means including means for effecting operation of said first cover feed means to feed covers to combinations of signatures for one group of subscribers and for effecting operation of said third cover feed means to feed covers to combinations of signatures for another group of subscribers.

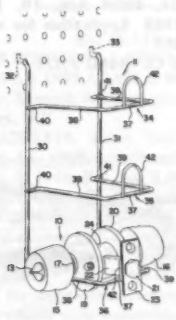
Re. 29,106
DISPLAY RACK FOR LOCKSETS

William M. Folberth, 3535 W. 140th St., Cleveland, Ohio 44111

Original No. 3,774,320, dated Nov. 27, 1973, Ser. No. 299,304, Oct. 20, 1972. Application for reissue Nov. 28, 1975, Ser. No. 635,841

Int. Cl.² G09B *25/00*

U.S. Cl. 35—49 **7 Claims**



1. In combination, a [cylindrical] lockset comprising a latch bolt assembly including a housing with an integral plate, and a knob and spindle assembly interconnectable with said latch bolt assembly; and a display and demonstrator rack comprising an upright frame, a plurality of vertically spaced supporting brackets extending outwardly from said frame and adapted to support in operable condition, said knob and spindle assembly, and a plurality of lockset retaining means, one being anchored to the outer portion of each of said brackets, each retaining means defining with its respective bracket an opening adapted to receive therethrough, said latch bolt housing and to retain said latch bolt plate on the outer side thereof, whereby said lockset is supported in operable condition for the purpose of demonstration, and secured against casual removal, on said rack.

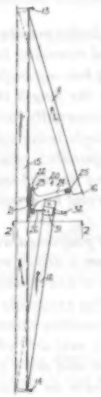
Re. 29,107
DOOR COORDINATOR

William B. Imhoff, Springdale, Conn., assignor to Leigh Products, Inc., Coopersville, Mich.

Original No. 3,894,356, dated July 15, 1975, Ser. No. 455,609, Mar. 28, 1974. Application for reissue Mar. 8, 1976, Ser. No. 664,882

Int. Cl.² E05C *7/05*

U.S. Cl. 49—366 **12 Claims**



1. A door coordinator adapted to control the closing of a pair of swinging doors constituted by an active door and an inactive door hung to swing into and out of closed position beneath a head frame, the coordinator comprising a hub, means mounting the hub on the head frame for rotation about a horizontal axis higher than the top edges of the doors, a pair of arms of unequal length fixed to and projecting from the hub and having their axes in a plane containing the axis of the hub, means limiting the downward swinging movement of said arms, the longer arm being angled with respect to the hub to cause its free end to lie, when below horizontal, in the swinging path of the active door, the shorter arm having a downwardly facing substantially straight elongated cam surface, the cam surface terminating at a bottom edge lying substantially parallel to said plane, and a roller mounted on said shorter arm with its periphery projecting beyond said bottom edge adjacent to the point of termination of the cam surface, said cam surface, in the lower position of the arms, lying in the swinging path of the upper edge of the inactive door.

Re. 29,108

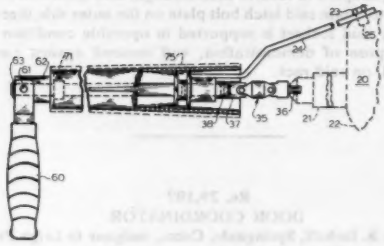
DRILL-OPERATED ABRADING TOOL

William M. Atwater, Pittsboro, N.C., assignor to Harriss-Conners Chevrolet, Inc., Chapel Hill, N.C.

Original No. 3,869,832, dated Mar. 11, 1970, Ser. No. 474,131, May 28, 1974. Application for reissue Dec. 9, 1975, Ser. No. 639,207

Int. Cl.² B24B *23/02*

U.S. Cl. 51—170 PT 2 Claims



2. A portable abrading tool adapted to be removably secured to a hand electric drill of the type having a front housing, a chuck supported on the face of said housing, said tool comprising, in combination:

a. a hollow elongated cylinder member having at least one slit in the wall thereof and extending for a major portion of the length thereof, having bearing surfaces within said cylinder member intermediate the length thereof and at oppositely disposed positions substantially radially removed from said slit, said bearing surfaces being adapted to receive a camming pressure for expanding said cylinder member, said cylinder member being open at one driven end and being closed at the opposite end by a wall having a central aperture;

b. a drive shaft centrally positioned within said cylinder member and extending from a driven end proximate said cylinder member open end to and through said cylinder member closed end and providing externally of said cylinder member closed end a handle mounting extension portion, said driven end being secured to a said drill chuck;

c. a bearing mounted on said drive shaft handle portion and having connected thereto an auxiliary handle and locking means secured to said drive shaft for retaining said handle bearing on said shaft;

d. camming means secured to said drive shaft and disposed between said bearing surfaces, said camming means when rotated with respect to said bearing surfaces being operable in a first rotative position to contact said bearing surfaces and expand said cylinder member to tighten any abrading sleeve positioned thereon and in a second rotative position being movable out of contact with said bearing surfaces to allow said cylinder member to contract and said abrading sleeve to be removed;

e. a support bearing mounted internally of said cylinder member outwardly from said camming means and proximate said shaft driven end; and

f. an abrading sleeve having an appropriate length and internal diameter fitted on said cylinder member and adapted to be tightened thereon by rotation of said caming means against said bearing surfaces to said first rotative position and to be loosened for relacement by rotation of said camming means to said second rotative position.

Re. 29,109

APPARATUS FOR THE DETERMINATION OF INTERNAL COMBUSTION ENGINE COMPRESSION PRESSURE

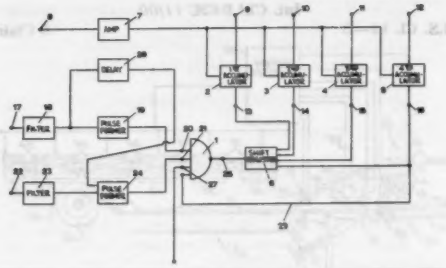
Hans-Gunther Petersen, Parkridge, N.J., and Heiko Requardt, Gifhorn, Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Original No. 3,713,331, dated Jan. 30, 1973, Ser. No. 116,957, Feb. 19, 1971. Application for reissue June 7, 1974, Ser. No. 477,346

Claims priority, application Germany, Feb. 20, 1970, 2007806

Int. Cl.² G01M *15/00*

U.S. Cl. 73—117.2 10 Claims



11. Apparatus for the determination of cylinder compression pressure of an internal combustion engine having a starter, by storage of signals representative of starter current and generating coordination signals from the ignition impulses of the engine, the apparatus comprising, a gating circuit having a first input for receiving signals corresponding to the ignition impulses of all cylinders of the engine, and a second input for receiving signals initiated by the ignition impulses from a selected engine cylinder;

means for storing said signals representative of starter current; and

said gating circuit passing to said means for storing said signals received by said first input only during presence of said signals received by said second input for actuating said means for storing.

Re. 29,110

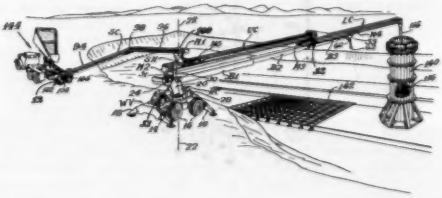
BOOM MOUNTED CONVEYING MEANS

Robert F. Oury, Elmhurst, Ill., assignor to Rotec Industries, Inc., Elmhurst, Ill.

Original No. 3,598,224, dated Aug. 10, 1971, Ser. No. 778,242, Nov. 22, 1968. Application for reissue July 13, 1973, Ser. No. 380,089

Int. Cl.² B65G *15/26*

U.S. Cl. 198—314 20 Claims



15. A self-propelled crane having an extendable boom and an extendable conveyor system, comprising in combination:

a. a self-propelled crane having a main boom and at least one extendable boom extendable and retractable parallel to said main boom;

b. a main conveyor connected in spaced relationship above said main boom, said main conveyor having a flexible endless belt driven by at least one motor;

c. a feed conveyor movably attached to said main conveyor at one end thereof and adapted to convey materials from a loading point onto said main conveyor, said feed conveyor having an endless conveyor belt;

d. an extension conveyor connected at one end to an extendable and retractable boom, and said extension conveyor having a flexible endless belt driven by at least one motor;

e. said main conveyor being spaced above said main boom sufficiently to allow said extension conveyor to move between said main boom and said main conveyor during extension and retraction of said extension conveyor by said extendable and retractable boom extending and retracting; whereby materials are adapted to be placed over an area defined by the extension and retraction of said extension conveyor;

f. said feed conveyor being adapted to discharge materials onto said main conveyor and said main conveyor being adapted to discharge materials onto said extension conveyor and said extension conveyor being adapted to discharge said materials from said conveyor apparatus; and

g. said crane boom being rotatable for rotating said main conveyor on said vehicle for extending the area of placement of materials by said apparatus.

Re. 29,111

PHOTOGRAPHIC DEVELOPER COMPOSITION CONTAINING FORMALDEHYDE BISULFITE ALKANOLAMINE CONDENSATION PRODUCT AND FREE ALKANOLAMINE

Thomas J. Masseth, Sweden, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Original No. 3,573,914, dated Apr. 6, 1971, Ser. No. 661,532, Aug. 18, 1967. Continuation-in-part of Ser. No. 583,935, Oct. 3, 1966, abandoned. Application for reissue Jan. 7, 1976, Ser. No. 647,299

Int. Cl.[2] G03C *5/30*

U.S. Cl. 96—66.4 **17 Claims**

1. A liquid photographic developer composition comprising:

a. a *dihydroxybenzene* silver halide developing agent,

b. a [carbonyl] *formaldehyde* bisulfite-alkanolamine condensation product, and

c. at least about 0.075 mole of free alkanolamine per liter of developer composition.

Re. 29,112

METHODS OF FORMING A FIBER REINFORCED PIPE ON AN INFLATABLE MANDREL

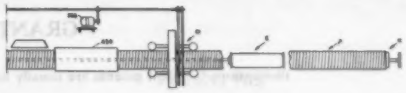
J. Warne Carter, Summit, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Original No. 3,700,519, dated Oct. 24, 1972, Ser. No. 824,153, May 13, 1969. Continuation-in-part of Ser. No. 577,035, Sept. 2, 1966, Pat. No. 3,507,412, which is a continuation-in-part of Ser. No. 387,372, Aug. 4, 1964, abandoned, and a continuation of Ser. No. 705,564, Feb. 14, 1968. Application for reissue Dec. 5, 1975, Ser. No. 638,204

Int. Cl.[2] B65H *81/06*; **B65C** *3/26*

U.S. Cl. 156—156 **33 Claims**

1. A method for continuously making substantially rigid, fiber reinforced plastic pipe comprising providing an air impervious conveyor tube on an axially fixed, hollow mandrel, the mandrel being provided with means to furnish an air seal with the interior of the conveyor tube as the conveyor tube is continuously advanced over the mandrel, winding a plurality of bands of thermosetting resin composition impregnated continuous fiber elements onto the conveyor tube to provide a pipe assembly, rotating the pipe assembly with respect to the mandrel, curing the thermosetting resin composition, providing an air seal at the forward end of the pipe assembly being generated, linearly advancing the pipe assembly by directing air under pressure through the mandrel and out from the



forward end thereof into the interior of the pipe assembly, [and] controlling the rate of linear advancement of the pipe assembly [,] *and providing a temporary seal to prevent the loss of pressure within the advancing pipe assembly when a section thereof is cut and to allow providing an air seal at the forward end of the pipe assembling being generated.*

Re. 29,113

TRIANGULAR PIEZOELECTRIC TRANSDUCER FOR RECORDING VIDEO INFORMATION

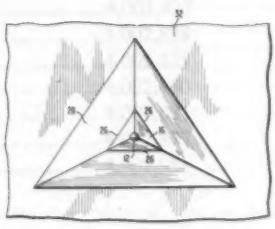
Jerome Barth Halter, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Original No. 3,865,997, dated Feb. 11, 1975, Ser. No. 351,599, Apr. 16, 1973. Application for reissue Sept. 12, 1975, Ser. No. 612,737

Claims priority, application United Kingdom, Apr. 19, 1972, 18039/72

Int. Cl.[2] G11B *3/00*; **H04R** *17/04*; **H01V** *7/00*

U.S. Cl. 358—128 **14 Claims**



1. Apparatus for providing displacement of a cutting stylus in response to electrical signals and adapted for mounting to a bracket comprising:

(*1*) a pedestal having first and second opposing sides of different surface area;

(*2*) a cutting stylus; [a stylus mount having a base region and adapted for receiving said cutting stylus;]

(*3*) a piezoelectric element having first and second opposing sides, said first side of said *piezoelectric* element adjacent to and rigidly coupled to a first side of said pedestal [and said second side of said element adjacent to and rigidly coupled to said base region of said stylus mount,];

(*4*) *means for rigidly coupling said cutting stylus to said second side of said piezoelectric element;*

said pedestal, *said* piezoelectric element, and [stylus mount] *said coupling means* forming a structure having all external surfaces disposed anti-parallel to each other;

(*5*) means for providing electrical signals to said piezoelectric element; and

(*6*) means for mounting said second side of said pedestal on said bracket.

PLANT PATENTS

GRANTED JANUARY 11, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,009

LADY UARDA

Carl A. Larsen, 2561 Elm Ave., Salt Lake City, Utah 84109

Filed July 11, 1975, Ser. No. 595,070

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plants—66 **1 Claim**

1. A new and distinct variety of *Syringa vulgaris* hybrid French Lilac plant, characterized in that the mature plant is about 9 feet high and about 6 feet wide; and in that its flowers are magenta to burgundy, and very large when compared with other French Lilac hybrid plants, with large florets and tight flowers spikes that are well formed.

PATENTS

GRANTED JANUARY 11, 1977

ERRATA

For CLASS	See PATENT NO.
024–016 PB	4,001,898
062–028	4,002,042
172–581	4,002,334
096–001 R	4,002,409
429–194	4,002,492
429–026	4,002,493
429–089	4,002,494
426–087	4,002,495
429–052	4,002,496
536–017	4,002,608
536–119	4,002,609
424–037	4,002,718
427–078	4,002,735
260–346.2 R	4,002,793
358–106	4,002,823
358–180	4,002,824
325–032	4,002,825
358–128	4,002,826
343–005 SC	4,002,827
358–240	4,002,828
358–286	4,002,829
358–293	4,002,830
358–254	4,002,831
200–159 A	4,002,879
318–117	4,002,954

PATENTS

GRANTED JANUARY 11, 1977

LIBRATA

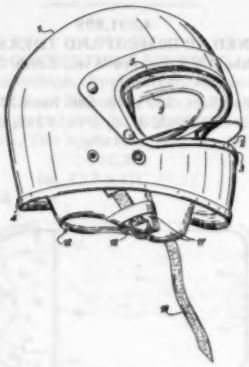
PATENTS

GRANTED JANUARY 11, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

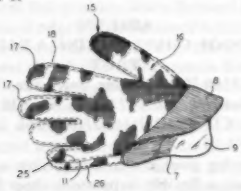
GENERAL AND MECHANICAL

4,001,894
PROTECTIVE HELMET
Gérard Roques-Rogery, Vineuil Saint Firmin, France, assignor to S.I.D.A.C. S.A., Paris, France
Filed Apr. 19, 1974, Ser. No. 462,578
Claims priority, application France, Apr. 20, 1973, 73.14537
Int. Cl.² A42B *3/02*
U.S. Cl. 2—415 **1 Claim**



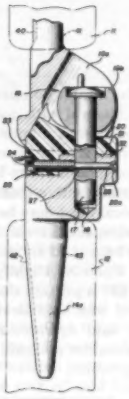
1. A protective helmet, comprising, in combination, an open shell covering the wearer's head a transverse opening in said shell in register with the wearer's eyes, two layers of appropriate thickness of an elastic and resilient material secured with said shell to dampen shocks, an internal hood within said shell, a hood with ears directly fixed to the inside of the shell and tightly covering the wearer's skull, nape and temples, said hood with ears forming an extension of said shell, side straps for said hood with ears for securing the helmet under the wearer's chin, said shell and said hoods being interconnected along a substantially circular contact zone inside of said shell to said shell between said two layers, said hood comprising two thicknesses of synthetic fabric containing a layer of resilient material.

4,001,895
PANELED DIP-COATED WORK GLOVE
Neal Ian Cohen, Glenview, Ill., assignor to Magid Glove Manufacturing Company, Inc., Chicago, Ill.
Filed Sept. 4, 1975, Ser. No. 610,171
Int. Cl.² A41D *19/00*
U.S. Cl. 2—161 R **11 Claims**



1. A dip-coated work glove comprising:
an exterior surface layer of plastic material enveloping a substantial portion of said work glove,
an interior lining layer which directly contacts and surrounds a hand upon insertion of said hand into said glove,
said interior lining layer having a front portion, a back portion, and extension panel means,
said front portion, back portion and extension panel means integrated into one piece by lining portion attachment means, and
said interior lining layer and said exterior surface layer integrally joined to one another in a juxtaposed position by layer attachment means.

4,001,896
PROSTHETIC JOINT FOR TOTAL KNEE REPLACEMENT
Robert Arkangel, Warsaw, Ind., assignor to Zimmer, U.S.A. Inc., Warsaw, Ind.
Substitute for Ser. No. 584,796, June 9, 1975, abandoned. This application Jan. 26, 1976, Ser. No. 652,587
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.91 **3 Claims**

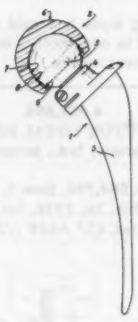


1. A joint prosthesis comprising a first prosthetic member for fixation to a first skeleton element and including a convexly shaped articulation surface for location at the distal end of said first skeleton element, a second prosthetic member for fixation to a second skeleton element adjacent said first skeleton element, and having a boss extending upward therefrom said boss having an aperture extending therethrough link means interconnecting first and second prosthetic members for pivotal movement relative to one another, a removable plateau secured to said second prosthetic member having a recess to receive said boss and prevent rotational movement of said plateau relative to said second prosthetic member and including a front wall portion immediately in front of said boss to define an end wall surface of said recess, aligned apertures extending through said front wall portion and said boss and said member providing an engagement surface for said first prosthetic member, said link means pivotally connecting said first and second prosthetic members to provide a sliding engagement between said convexly shaped articulation surface and said engagement surface of said plateau, and removable fastener means including a threaded shaft having one end thereof split, a chamfer formed at one end of said boss to receive the split end of the threaded shaft, whereby the split end can be spread to retain the threaded shaft in position, said shaft extending through said aligned apertures of said plateau and said boss to retain said plateau to said second prosthetic member, whereby said plateau can be selectively removed and replaced when worn.

4,001,897
PROSTHESIS FOR A JOINT

Andre Rambert, Residence Florentine Avenue Lacassagne, Lyon 3eme, Rhone, France, and Gilles Bousquet, 19 Avenue Berranger, Ecully, Rhone, France

Filed Jan. 27, 1976, Ser. No. 652,810
Claims priority, application France, Jan. 31, 1975, 75.03645
Int. Cl.² A61F 1/24
U.S. Cl. 3—1.913 5 Claims

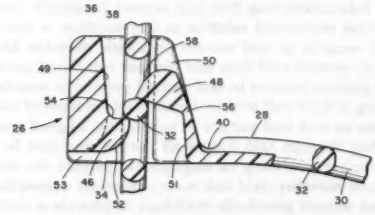


1. A prosthesis for a joint comprising, in combination:
a spherical head integral with a part which is to substitute for at least a portion of a bone, and
a spherical cap which is to be accommodated and supported in a patient, said spherical cap having (1) an inside spherical bearing surface with a given diameter so as to ensure that said spherical head may be accommodated and have freedom of movement therein, (2) an internal cylindrical shoulder at its base, said shoulder being narrow in width and having a diameter slightly smaller than said given diameter, and (3) a portion defining an inner cylindrical surface co-axial with said bearing surface and adjacent said shoulder, said cylindrical surface being disposed between said shoulder and said spherical surface when in its utilization position.

4,001,898
FIXED DOG LADDER STRAP

Jack E. Caveney, Hinsdale, Ill., assignor to Panduit Corporation, Tinley Park, Ill.

Filed Oct. 6, 1975, Ser. No. 619,884
Int. Cl.² B65D 63/00
U.S. Cl. 24—16 PB 14 Claims

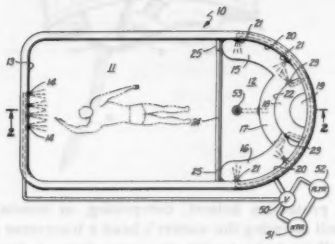


1. A self-locking cable tie for forming a plurality of elongate objects such as wires into a bundle and comprising:
an elongate flexible strap positionable about the objects to be bundled and including a plurality of spaced transversely extending abutments, said strap being of the ladder type having a pair of spaced, generally longitudinally extending side rails, said abutments constitute rungs joining said rails;
a head extending from adjacent one end of said strap, having a strap entrance face and a strap exit face, and having a transverse aperture extending between said faces for receiving the distal end of said strap;
non-pivotal locking means carried by said head and extending into said aperture for securely engaging a preselected one of said abutments; and
pusher means carried by said head and extending into said aperture and responsive to retrograde movement of the strap to push the abutment to be held into engagement with said locking means, said pusher means having a position wherein its spacing from said locking means is sufficient to permit strap passage therebetween whereby said strap can be threaded with relatively low force as said pusher means is not required to resist strap withdrawal forces.

4,001,899
COMBINED SWIMMING AND THERAPY POOL

Cleo D. Mathis, 1808 Potrero Ave., South El Monte, Calif. 91733

Filed Sept. 22, 1975, Ser. No. 615,208
Int. Cl.² E04H 3/16, 3/18; F16L 22/02
U.S. Cl. 4—172 5 Claims



1. A swimming pool having a length only slightly greater than the length of the human body, said pool having a substantially vertical wall at one end thereof, jet water outlet means directed horizontally inwardly from said vertical wall, said jet water outlet means being constructed and arranged to move water into said swimming pool in a horizontal direction with sufficient force so that a user can swim for an extended period of time in a substantially stationary horizontal position within said swimming pool in the opposite direction against the force of the water entering said pool from said jet water outlet means, and a therapy pool disposed directly adjacent to said swimming pool, said swimming pool and therapy pool comprising adjacent areas of a single pool, said therapy pool being of shallower depth than said swimming pool, said therapy pool having horizontally directed seat means and second jet water outlet means directed substantially horizontally toward said seat means.

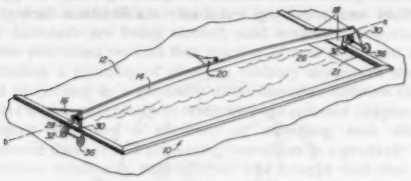
4,001,900
SWIMMING POOL COVER HAVING A RAISED LEADING EDGE

Joe H. Lamb, 3500 Hillside Lane, Salt Lake City, Utah 84109

Filed Nov. 10, 1975, Ser. No. 630,316
Int. Cl.² E04H 3/16, 3/18; F16L 22/02
U.S. Cl. 4—172.14 9 Claims

1. A swimming pool cover comprising a rasised bowed tubular member, a flexible impervious sheet having a beaded longitudinal side edge and a beaded forward leading edge for engagement into a longitudinal and forward track or channel means respectively, said longitudinal track or channel being mounted to the side margins of a swimming pool and said forward track or channel means being fixed to said bowed tubular member, said bowed tubular member adapted to hold said beaded forward or leading edge, wheeled support mem-

bers fixed to the ends of said bowed tubular member for maintaining said leading edge of said pool cover in a raised



position, and a stop member fixed to the ends of said bowed tubular member for limiting the rolling action of said wheeled support members of said bowed tubular member.

4,001,901

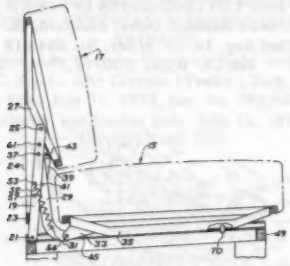
CONVERTIBLE SEAT-BED

Howard M. Quakenbush, Apple River, Ill., assignor to Flexsteel Industries, Inc., Dubuque, Iowa

Continuation-in-part of Ser. No. 402,860, Oct. 2, 1973, Pat. No. 3,913,152. This application Aug. 6, 1975, Ser. No. 602,203

Int. Cl.² A47C *17/17*

U.S. Cl. 5—37 R **12 Claims**



1. In a convertible seat-bed assembly, a unit including a generally rectangular back having generally parallel opposite top and bottom edge portions, back support means supporting said back for movement between an inclined seating position in which said top edge portion thereof is in a first position spaced upwardly and rearwardly with respect to said bottom edge portion thereof and a bed position in which said top edge portion thereof is in a second position spaced rearwardly from and in horizontal alignment with said bottom edge portion thereof, a generally rectangular seat having generally parallel forward and rearward edge portions, seat support means supporting said seat for movement between a rearward seat position in which said rearward edge portion thereof is disposed below and behind said bottom edge portion of said back when said back is in said first position and a forward bed position in which said rearward edge portion thereof is contiguous to said bottom edge portion of said back with the upper surface of said back and seat then being in a common horizontal plane, said back support means comprising arm means pivotal about a first horizontal axis below said back and pivotally connected to said back on a second horizontal axis, first link means pivotally connected to said seat on a third horizontal axis and pivotally connected to said arm means on a fourth horizontal axis, and second link means pivotally connected to said first link means on the fifth horizontal axis and pivotally connected to said back on a sixth horizontal axis, said second horizontal axis being spaced a first predetermined distance from said first horizontal axis and being on the rearward side of said back and spaced a second predetermined distance from said bottom edge portion of said back, said fourth horizontal axis being spaced a third predetermined distance from said second horizontal axis and said sixth horizontal axis being spaced a fourth predetermined distance from said fifth horizontal axis, the relationship between said first, second, third and fourth predetermined distances being such that said top edge portion of said back is moved in a substantially vertical path between said first and second positions thereof when said seat is moved forwardly and rearwardly between said rearward seat and forward bed positions thereof.

4,001,902

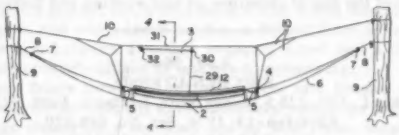
SUSPENDED BED AND SHELTER

John O. Hall, and Anna Cobb Hall, both of 1419 N. Negley, Pittsburgh, Pa. 15206

Filed Jan. 16, 1975, Ser. No. 541,598

Int. Cl.² A45F *3/22*

U.S. Cl. 5—121 **16 Claims**



1. A combination comprising a hammock, an insulated sleeping bag and a tent;

said hammock being a generally rectangular shaped sheet of material, providing a relatively level support surface for at least one occupant, with the longest edges thereof each defining a catenary curve, including a spreader bar attached to each of the shortest edges thereof and means for adjustably suspending said hammock attached to each said spreader bar;

said insulated sleeping bag formed of an upper insulated portion and a lower insulated portion, wherein said upper portion is attached to one of said longest edges of said hammock material and said lower portion is attached to substantially cover and insulate the underside of said hammock material; and

said tent includes means for attaching said tent to said longest edges of said hammock material and means for supporting said tent above said hammock and said sleeping bag.

4,001,903

WORKPIECE MANIPULATING DEVICES

Robert B. Hay, 100 Appleton St., North Andover, Mass. 01845

Filed Jan. 22, 1975, Ser. No. 543,057

Int. Cl.² B25F *1/00*

U.S. Cl. 7—1 M **10 Claims**

1. A workpiece manipulating device comprising an elongate handle, the upper end of which defines a hand grip and the lower end of which comprises a laterally flattened working end portion composed of a rigid and relatively soft material, the terminus of said working end portion having a triangular notch extending upwardly and inwardly from the respective

laterial margins thereof, the angle defined between the adjacent sides of said triangular notch being essentially a right

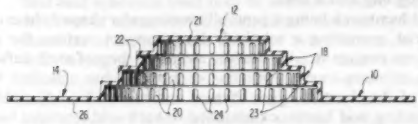
angle and the apex thereof being located substantially to one side of the lateral centerline of said working end portion.

4,001,904

KITCHEN UTENSIL

Walter L. Gill, 225 S. Buena Vista, Redlands, Calif. 92373

Filed Feb. 13, 1976, Ser. No. 658,020
Int. Cl.² B67B 7/18; B25F 1/00
U.S. Cl. 7—14.6 3 Claims



1. A kitchen utensil comprising

a body molded of flexible rubber or synthetic plastic and including a central stepped frustro-conical hollow portion surrounded by a flange extending radially from the edge of the largest diameter of the hollow portion,

the stepped portions of the hollow portion including a plurality of axially disposed cylindrical walls having on their inner surfaces axially extending ribs spaced therearound, said walls being connected by radially disposed annular walls between one end of a larger cylindrical wall and the corresponding opposite end of the next smaller cylindrical wall, the steps being arranged in successively smaller diameters and closed by a wall spanning the area of the smallest of the cylindrical walls,

the surface of the flange corresponding to the hollow side of the stepped portion defining a pattern of textural roughness thereon to facilitate scrubbing of pots and pans.

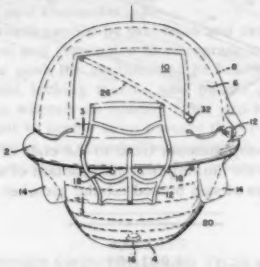
4,001,905

IMPROVED STABILIZED SURVIVAL RAFT

James A. Givens, 18105-33rd NE., Seattle, Wash. 98155

Continuation-in-part of Ser. No. 314,389, Dec. 12, 1972, Pat. No. 3,883,913, which is a continuation-in-part of Ser. No. 216,990, Jan. 11, 1972, abandoned. This application May 2, 1975, Ser. No. 573,914
Int. Cl.² B63C 9/04
U.S. Cl. 9—11 A 9 Claims

2. A stabilized life raft having a peripheral, inflatable member supporting a floor spanning the interior distance of the raft and a stabilizing chamber defined by the floor of the raft and a wall structure spaced from said floor, a peripheral trough surrounding said chamber, said trough filling with the supporting fluid and providing temporary stabilization during the



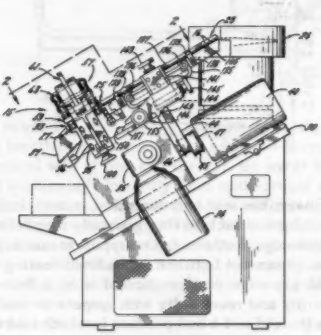
filling of the main chamber, said chamber being filled with the supporting fluid when in use and means separating the stabilizing chamber into communicating sections permitting controlled fluid flow between the chambers to assure stability even though the weight in the raft shifts.

4,001,906

MACHINE FOR CUTTING SLOTS IN SCREW SHANKS

John N. Betz, 4624 Redbluff Drive, Rockford, Ill. 61107

Filed Aug. 14, 1975, Ser. No. 604,618
Int. Cl.² B23G 9/00, 11/00
U.S. Cl. 10—2 20 Claims



1. A machine for forming slots in the shanks of fasteners comprising a frame, a fastener-carrying disk mounted on said frame, indexing means connecting with said disk to move the latter intermittently along a predetermined path through spaced fastener-receiving, slotting and exit stations, cutting means at said slotting station for forming slots in the fasteners during a dwell period, feed means at said fastener-receiving station for directing the fasteners onto said disk, and clamping mechanism supported by said frame for holding the fasteners on said disk as the latter is rotated along said path from said receiving station, through said slotting station and to said exit station, said mechanism including a support mounted on said frame for movement between an in-service position and an out-of-the-way position, an actuator attached to said support and being movable bodily therewith, said actuator being spaced a predetermined distance from said disk when said support is in its in-service position, an adapter connected with said disk for bodily rotation therewith and being located between said actuator and said disk, clamping members carried on said adapter and being movable relative to said adapter toward and away from said disk for clamping said fasteners on said disk as the fasteners are carried along said path and

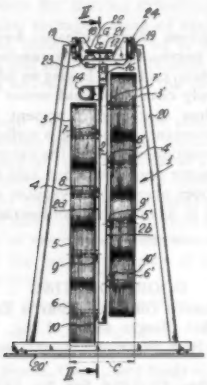
through said slotting station, said actuator engaging said members as they are moved between said receiving and exit stations to urge said members toward said disk to clamp the fasteners on said disk as the latter is being moved and while the fasteners are being slotted, said actuator comprising a turret journaled on said free portion of said arm, said turret including a plurality of plungers slidably supported thereon and projecting in a generally axial direction relative to said turret urging said plungers resiliently toward said adapter, said adapter including a plurality of clamping rods slidably mounted thereon and projecting therefrom in a generally axial direction relative to said adapter and toward said disk, said rods being engaged by said plungers between said fastener-receiving and exit stations to connect said turret for bodily rotation with said adapter and to urge said rods toward said disk thereby clamping the fasteners to said disk.

4,001,907

VEHICLE-WASHING STATION WITH SCRUBBING UNIT COMPOSED OF VERTICALLY SUPERPOSED ROTARY BRUSHES

Uberto Capra, Alte Ceccato (Venice), Italy, assignor to Ceccato & C. S.p.A., Alte Ceccato (Venice), Italy

Filed July 11, 1975, Ser. No. 595,084
Claims priority, application Italy, July 11, 1974, 25003/74
Int. Cl.² B60S *3/06*
U.S. Cl. 15—53 A **9 Claims**



1. In a vehicle-washing station, in combination:

support means positionable adjacent a vehicle to be washed, said support means including an overhead mounting and a depending arm pivotally secured to said mounting for swinging in a vertical plane;

at least one scrubbing unit on said support means including an array of vertically superposed cylindrical brushes journaled on said arm and centered on generally horizontal axes lying in a common plane transverse to said vertical plane;

drive means for jointly rotating said brushes about their axes; and

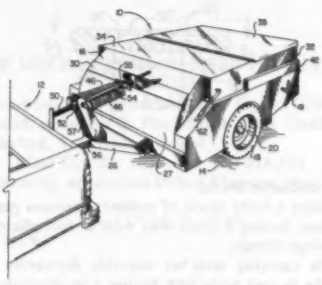
guide means enabling relative horizontal displacement of said support means and said vehicle along an upright vehicular surface parallel to said axes in contact with said brushes.

4,001,908

SWEEPING APPARATUS FOR COUPLING TO A MOTORIZED VEHICLE

David W. Franklin, 3416 Stanford St., Dallas, Tex. 75225

Filed Mar. 3, 1975, Ser. No. 554,967
Int. Cl.² E01H *1/04*
U.S. Cl. 15—83 **7 Claims**



1. For coupling to a motorized vehicle, a brushing apparatus of the type having a housing supporting a transversely extending brush rotatably mounted therein for sweeping and moving dirt, debris and the like from a surface over which the vehicle may pass, and which brush rotation is derived from an interconnection between a surface engaging wheel and a drive capstan coaxially affixed to said brush, comprising:

a tow frame forwardly extending from said housing and adapted for coupling to the motorized vehicle for towing;

hinge means on a rearward end of said frame hingedly attaching said frame to the housing; and

expansion linkage means interconnecting a portion of said tow frame and a portion of the housing for determining the resulting angularity between said tow frame and the housing and the degree of engagement of the brush with the surface over which the vehicle may pass.

4,001,909

CHILD'S TOOTHBRUSH HAVING A WHISTLE

Wallace A. Erickson, Chicago, and David K. Erickson, Skokie, both of Ill., assignors to Wallace A. Erickson & Company, Chicago, Ill.

Filed Feb. 2, 1976, Ser. No. 654,217
Int. Cl.² A46B *17/04*; G10K *5/00*
U.S. Cl. 15—105 **3 Claims**

1. A combined toothbrush and whistle device, said device comprising:

a brush having a bristle portion and a shaft;

a hollow cover adapted to fit over and slide relative to said shaft;

said cover having two ends, one which is an open, outboard end and a top, bottom and side walls;

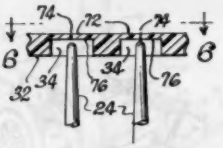
said cover having a tapered opening in said top wall located near said outboard end, said taper running downward and toward the free end of the cover;

and means connecting said shaft portion and said cover whereby said cover is positioned to embrace said shaft and is adapted to move relative to said shaft portion to provide a whistle in which one can play a range of musical notes when air is blown into said open outboard end of said cover and the cover adjusted.

4,001,910
RETRACTABLE BRUSHES

Lester R. Peilet, 6144 N. Talman Ave., Chicago, Ill.

Filed May 21, 1975, Ser. No. 579,441
Int. Cl.² A46D 7/00, 15/00, 17/06
U.S. Cl. 15—184 9 Claims

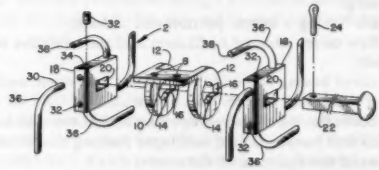


1. A retractable brush,
comprising a body made of resilient resinous plastic material and having a front wall with a multiplicity of guide openings therein,
a bristle carrying member movable forwardly and rearwardly in said body and having a multiplicity of bristle elements thereon movable forwardly and retractable rearwardly in the respective openings between extended and retracted positions,
said bristle elements extending through said openings and projecting forwardly from said front wall when said bristle elements are in said extended position,
said bristle elements being retracted rearwardly into said openings and having tip portions guided in said openings when said bristle elements are in said retracted position,
and a multiplicity of flexible flaps formed integrally with said front wall and extending across substantially the entire front of each of said guide openings for substantially closing said openings when said bristle elements are moved to said retracted position, said flaps being substantially thinner in cross-section than the cross-section of said front wall,
said tip portions of said bristle elements being disposed and guided in said guide openings and to the rear of said flexible flaps when said bristle elements are in said retracted position,
said bristle elements being movable through said guide openings and past said flexible flaps when said bristle elements are moved to said extended positions,
said flexible flaps being in wiping engagement with said bristle elements to clean said bristle elements as they are retracted from said extended position to said retracted position.

4,001,911
MANUALLY OPERATED ROTARY SEWER CLEANOUT DEVICE

Clyde W. Watson, 1916 SE. 6th Ave., Mineral Wells, Tex. 76067

Filed July 9, 1975, Ser. No. 594,607
Int. Cl.² B08B 9/02
U.S. Cl. 15—104.3 SN 7 Claims

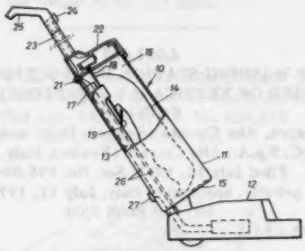


2. A manually operated pipe cleanout device, which device comprises;
a. a non-rotatable, mounting member for attachment to a plumber's fish tape for longitudinal movement in a pipe,
b. a rotatable member having outstanding tines thereon, which member is mounted on said mounting member for rotation in the pipe, when said mounting member is moved in one direction,
1. locking means to restrain said rotatable member against rotation when said mounting member is moved in the opposite direction,
c. the axis of said rotatable member is transverse to the longitudinal axis of the pipe,
d. each said tine on said rotatable member has a portion thereof curved, which curved portions of said tines extend in the direction to rotate counter to the direction of rotation of said rotatable member.

4,001,912
VACUUM CLEANER DEVICE

Bolik Anders Gottfrid Eriksson, Johanneshov, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Jan. 16, 1976, Ser. No. 649,692
Claims priority, application Sweden, Jan. 31, 1975, 7501051
Int. Cl.² A47L 5/28
U.S. Cl. 15—339 7 Claims

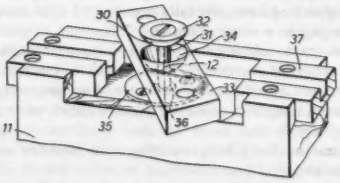


1. In a motor-driven vacuum cleaner having a dust container with an air pervious portion connected to a relatively rigid attachment plate, said plate having an inlet for dust-laden air, a current supply circuit for said motor that is normally open when no dust container is present in said vacuum cleaner, the improvement comprising: a surface of said attachment plate being positioned to close the current supply circuit and render said motor operative when said dust container is inserted in the proper place in said vacuum cleaner, and said vacuum cleaner is in its operating configuration.

4,001,913
DOOR MOUNTING

William John Bernard Ollis, 6A Church End, Haddenham, Bucks, and Clive Beech Ansley Long, Newtons Farms Widemer End, High Wycombe, Buckinghamshire, both of England

Filed Dec. 17, 1974, Ser. No. 533,628
Int. Cl.² E05D 15/06
U.S. Cl. 16—88 6 Claims



1. A two-way opening door mounting comprising top door support means and a bottom door guide means each having a

component respectively for attachment to a door and a component for attachment to a door frame, wherein said support means include a pin and a seat having cooperating part spherical sliding bearing surfaces which define a range of substantially vertical hinge axes, said bearing surface of said seat facing away from said guide means and being located in said top support component, and said door guide means define two alternative laterally-spaced substantially vertical axes, whereby substantially the whole weight of a door is supported from the head of its frame by said door support means, and whereby said guide means serves to guide the opening of said door in each of opposite directions.

4,001,914

PROCESS AND APPARATUS FOR SHIRRING TUBULAR CASINGS

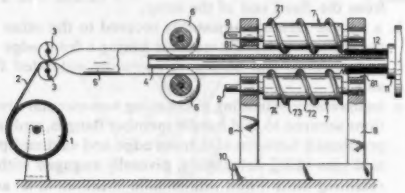
Ernst Riegler, Walluf; Heinrich Kron, Mainz-Mombach, and Klaus-Jürgen Bittner, Wiesbaden-Biebrich,, Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Feb. 26, 1974, Ser. No. 446,630

Claims priority, application Germany, Feb. 27, 1973, 2309720

Int. Cl.² A22C *13/02*

U.S. Cl. 17—42 **12 Claims**



1. In the process for shirring cylindrical tubular casings, especially artificial sausage casing of synthetic material, in which an inflated casing is conveyed in the direction of its longitudinal axis and shirred, with pleating, against a counter-force by shirring forces acting upon the circumference of the casing,

the improvement which comprises that the forces acting upon the surface of the casing do so continuously and simultaneously, at equal intervals, at a plurality of points on at least two straight lines extending parallel to and symmetrically about the longitudinal axis of the casing, the action of said forces being at right angles to the longitudinal axis of the casing, and, simultaneously, in the direction of the longitudinal axis of the casing, against said counter-force.

4,001,915

ELECTRIC EXTENSION OF HIND LEG

Ralph P. Prince, Storrs, Conn., and Rudy G. Westervelt, Newfield, N.Y., assignors to Council of Livestock Protection, Inc., New York, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,462

Int. Cl.² A22B *3/06*

U.S. Cl. 17—45 **2 Claims**

1. In a double rail conveyor system for slaughtering animals positioned in an upright position and employing apparatus for mechanical shackling of a slain animal, the method of extending the hind legs of said slain animal so as to enable said shackling apparatus to grab one of the hind legs of said slain animal and convey said slain animal in a position with the head directed downward, said method comprising

positioning said slain animal already in an upright position on said double rail conveyor to expose a bare skin spot near the anus;

placing an electrode on said bare skin spot near said anus;

placing a ground electrode on a bare skin spot between said hind legs; and

applying a voltage to said electrodes whereby said hind legs become extended and involuntary motion is suppressed thereby enabling said mechanical shackling means to grab one of said hind legs and convey said slain animal.

4,001,916

FEED MECHANISMS FOR FIBER PROCESSING MACHINES

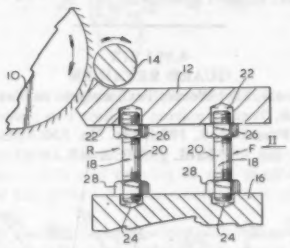
Keith Grimshaw, Todmorden, and Roy Taylor, Oldham, both of England, assignors to The English Card Clothing Company Limited, Yorkshire, England

Filed Oct. 21, 1974, Ser. No. 516,581

Claims priority, application United Kingdom, Nov. 10, 1973, 52292/73

Int. Cl.² D01H *15/40*

U.S. Cl. 19—96 **5 Claims**



1. In a fibre processing machine: a rotary feed roller; a fibre feed plate positioned with at least part of its operative surface adjacent to the surface of said feed roller; said feed plate being capable of a predetermined degree of deflection towards and away from said feed roller; and means for adjusting the relative displacement between the feed plate and the rotary feed roller comprising a series of individual supports arranged in at least two rows, each row including at least three supports for said feed plate spaced apart in a direction longitudinal of said feed plate, at least an intermediate one of said supports in each row comprising a jack which applies deflecting loads to said feed plate to deflect said feed plate to a predetermined degree for the purpose of controlling the spacing of the roller and plate, thereby exercising control over the feed of fibrous material between said feed plate and said feed rollers.

4,001,917

CARDING APPARATUS

Roy Taylor, 5, Tunstall Road, Oldham, Lancashire, England

Continuation-in-part of Ser. No. 516,581, Oct. 21, 1974, abandoned. This application May 8, 1975, Ser. No. 575,810

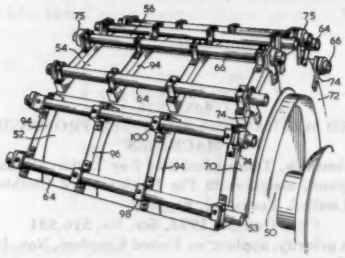
Claims priority, application United Kingdom, May 10, 1974, 20672/74; Oct. 25, 1974, 46376/74

Int. Cl.² D01G *15/24, 15/28*

U.S. Cl. 19—104 **10 Claims**

1. For use in a carding machine assembly having a rotating cylinder, a stationary carding plate assembly comprising a relatively rigid support structure adapted to be mounted in association with said carding machine whereby said support structure can bridge the part of the machine occupied by the rotating cylinder, an arcuate plate having card clothing on its concave front face, and means mounting said plate on said support structure comprising at least two mounting members secured on the back face of the plate in spaced relation laterally with respect to the axis of the cylinder and at least two

devices connecting each said member to the support structure, each said device being spaced circumferentially of the

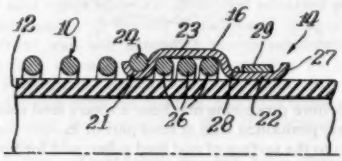


cylinder and having means for adjustably displacing said plate relative to said support structure.

4,001,918
GUARD RETAINER

Jimmy E. Moore, Fort Worth, Tex., assignor to Stratoflex, Inc., Fort Worth, Tex.

Filed Dec. 9, 1974, Ser. No. 530,952
Int. Cl.² F16L *11/00*; A44B *21/00*
U.S. Cl. 24—16 R **13 Claims**

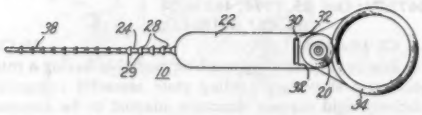


1. Apparatus comprising a coiled spring guard for use with a tubular member, said spring guard being adapted to be coiled around said tubular member, a clip comprising a portion at one end thereof fastened to a selected coil of said guard, said selected coil being displaced from an end of said guard, a portion at the other end of said clip positioned beyond the endmost coil of said guard and adapted to be fastened to said tubular member, and a portion between said ends of said clip overlying and extending closely adjacent the endmost coil of said guard.

4,001,919
SEAL

Sigurd M. Moberg, Orange, and George A. Lundberg, Pompton Lakes, both of N.J., assignors to E. J. Brooks Company, Newark, N.J.

Filed May 22, 1974, Ser. No. 471,828
Int. Cl.² B65D *63/00*
U.S. Cl. 24—16 PB **5 Claims**

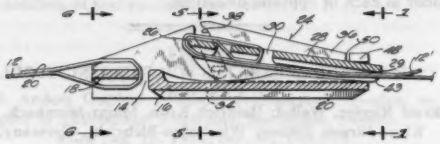


1. A shackle seal formed of resilient plastic, said seal comprising a housing forming a socket, a shackle extending from the housing, said socket and the remote end of the shackle having means for locking engagement forming a shackle loop when said end is inserted into said socket, and for extending through a device to be sealed, and other means attached to the housing and extending from the housing for grasping for breaking the shackle after the seal is assembled, said other means having an aperture dimensioned to receive a finger.

4,001,920
QUICK-DISCONNECT BUCKLE

Edwin L. Johnson, N. 166 W. 20832 Parkway Drive, Jackson, Wis. 53037

Filed July 31, 1975, Ser. No. 600,263
Int. Cl.² A44B *21/00*
U.S. Cl. 24—75 **7 Claims**



1. A quick-disconnect buckle for engaging and tightening the ends of a strap, said buckle comprising:

a. a frame member secured to one end of the strap, having upwardly extending flanges with transverse retaining slots with narrow apertures extending downwardly and away from the fixed end of the strap,

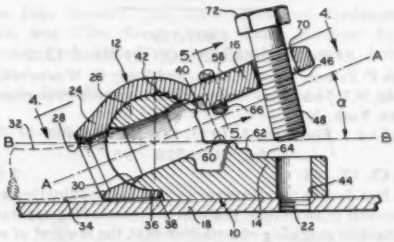
b. a handle member adjustably secured to the other end of the strap, said handle member having a front edge and an end portion, and having downwardly extended flanges, and

c. transversely extending pins having non-circular cross-sections secured to said handle member flanges, and laterally positioned between said front edge and said end portion, said pins being detachably, pivotally engaged within said retaining slots when said handle member is in an open position, and said pins being fixedly pivotally engaged within said retaining slots when said handle member pivots from an open to closed position, said end portion pivoting downwardly and said front edge pivoting forwardly and upwardly, thereby tightening the strap as said handle member pivots from an open to closed position.

4,001,921
CABLE CLAMP WITH SIZE ADJUSTMENT

Robert E. Lawlor, Huntington Beach, Calif., and Paul A. Cornell, Headborough House, Ireland, assignors to Paul A. Cornell, Headborough House, Ireland

Filed Sept. 4, 1975, Ser. No. 610,418
Int. Cl.² A44B *21/00*; H01R *9/10*
U.S. Cl. 24—132 LS **12 Claims**



1. A clamp type cable connector comprising:

a male member including a tail having a planar bottom surface for mounting said connector on a planar body; and a generally cylindrical head at one end of said tail, said head having a bore for receiving a cable;

a female member including a tail; and a generally C-shaped sleeve at one end of said tail, said sleeve having a bore for receiving said cable;

said sleeve being adapted to receive said head for rotatable movement between open and closed positions of said connector as said tails are moved apart or together, said bores being in generally axial registry when said tails are spaced apart in the fully open position of said connector, with the internal surfaces of said bores serving to clamp said cable upon relative rotation of said sleeve and head as said tails are moved together to close said connector; and

wherein the angle of the axis of the bore in said sleeve with the plane of said bottom surface when said connector is fully open is sufficiently small to permit insertion of a cable nearly as large in diameter as the diameter of said bore, and means for rotating said sleeve relative to said head between fully open and closed positions of said connector sufficiently to provide adequate clamping force on a cable of substantially smaller diameter than the diameter of said bore.

4,001,922

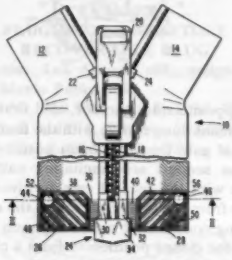
TAPE REINFORCEMENTS FOR SLIDE FASTENERS

H. Blair Ward, Jr., Guys Mills, Pa., assignor to Textron, Inc., Providence, R.I.

Filed Nov. 3, 1975, Ser. No. 628,310

Int. Cl.² A44B *19/36*

U.S. Cl. 24—205.11 F **1 Claim**



1. A slide fastener installation comprising

first and second mounting tapes, each of the tapes having inner and outer edges and a hole adjacent the outer edge of the tape,

a plurality of coupling elements secured to the inner edge of each of the tapes,

a slider entrained on said coupling elements and being movable therealong to engage and disengage the coupling elements,

a bottom stop including first and second bottom stop elements, each having a leg portion to receive the slider thereon,

each of the bottom stop elements including tape reinforcing members on opposite sides of each mounting tape extending away from the leg portions, and

a connecting plug extending through and filling the hole in each mounting tape,

each connecting plug being integrally formed with and joining together the tape reinforcing members on the opposite sides of each tape to insure that the tape reinforcing members cannot peel away from the outer edge of its mounting tape.

4,001,923

JEWELRY CLASP

Charles Frankel, Brooklyn, N.Y., and Max Skobel, Edison, N.J., assignors to MSL Laboratories Inc., Iselin, N.J.

Filed May 22, 1975, Ser. No. 579,838

Int. Cl.² A44B *17/00*

U.S. Cl. 24—230 SL **9 Claims**

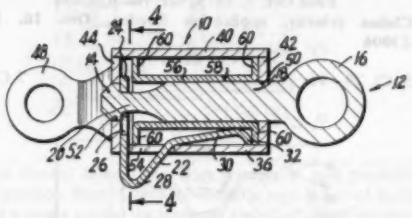
1. A jewelry clasp comprising

a female member having an opening therein;

a male member adapted to be inserted into said female member through said opening;

releasable locking means for engaging said male member to hold said male member to said female member;

said locking means including an integral one-piece locking member having a locking portion for engaging said male member, a resilient portion for biasing said locking portion against said male member, and an actuating portion for moving said locking portion relative to pressure of said resilient portion for releasing said male member to permit retraction of said male member from said female member;



holding means disposed within said female member for positioning said resilient portion relative to said female member;

said holding means including a hollow body element in alignment with said opening in said female member to receive and guide said male member through said female member;

said body element being provided with means to space said body element from internal sidewalls of said female member; and

said resilient portion of said locking member being disposed within the space provided between said body element and said internal sidewalls.

4,001,924

FITTING FOR ATTACHMENT TO A PIECE OF FABRIC

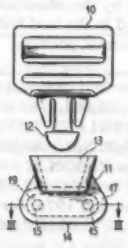
Sigurd Walter Bengtsson, Bruksgatan 17, 41451 Goteborg, Sweden

Filed June 10, 1975, Ser. No. 585,497

Claims priority, application Sweden, June 12, 1974, 7407732

Int. Cl.² A44B *19/00*

U.S. Cl. 24—230 F **8 Claims**



1. A buckle having a portion for being attached to fabric, comprising:

a. a first part having a side face for being disposed against one side of the fabric;

b. a second part having a side face for being disposed against the other side of the fabric;

c. at least one post extending from one of said parts for passing through the fabric into a bore in the other of said parts; and

d. a recess in one of said side faces and a raised portion of complemental shape on the other of said side faces extending about said at least one post and receivable in said recess, there being a peripheral clearance between said recess and said raised portion corresponding to the thickness of the fabric.

4,001,925

CUTTING TOOL

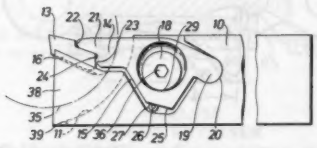
Stig-Lennart Eriksson, Fagersta, Sweden, assignor to Seco Tools AB, Fagersta, Sweden

Filed Oct. 7, 1975, Ser. No. 620,404

Claims priority, application Sweden, Oct. 16, 1974, 7413006

Int. Cl.² B26D *1/12*

U.S. Cl. 29—96 **7 Claims**



1. In a cutting tool such as a parting-off and recessing tool comprising a cutting insert and a tool holder therefor, said tool holder having a top face, a bottom, two opposed longitudinally extending side faces generally parallel to each other, a front and a back, said tool holder being provided at one of its side faces with a longitudinal recess, said longitudinal recess having a wall perpendicular to the top face of, and extending in the longitudinal direction of the tool holder and constituting an inner wall of said longitudinal recess, said longitudinal recess having a front part shaped as a support for the cutting insert and a main or back part containing a clamp, there being a bore extending transversely through said clamp and into the associated body of the tool holder, said bore being threaded in the holder for the reception of a screw, said bore terminating at the outer face of said clamp in a conical recess, said clamp being arranged as a lever forcing said cutting insert against said support, the clamp being held and operated by means of a screw in engagement with the tool holder, the improvement wherein screw (18) has a conical head (30), cooperating with the aforesaid conical recess (31) in the clamp (14), and a cylindrical shaft, said screw extending into the aforesaid bore from said outer face of said clamp and having an operating-key-receiving groove in the conical head so as to be operatively rotatable from the side face of said tool holder, wherein the clamp is supported by the aforesaid inner wall when the cutting insert is clamped in the tool holder, the cutting insert thus being fixed in its lateral position.

4,001,926

DOUBLE CLIPPER, SINGLE PISTON OPERATED DEVICE

Clyde R. Velarde, Raleigh, N.C., assignor to Rheem Manufacturing Company, New York, N.Y.

Continuation-in-part of Ser. No. 565,581, April 7, 1975. This application Mar. 18, 1976, Ser. No. 668,148

Int. Cl.² B23P *11/00*

U.S. Cl. 29—243.56 **12 Claims**

1. An improved clip attachment device comprising, in combination:

a mounting frame;

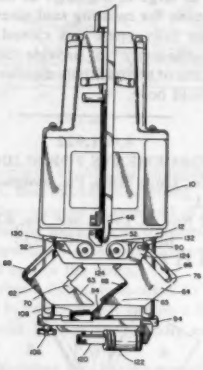
drive means mounted on the mounting frame, said drive means having a unitary drive shaft translatable between a projected position and a retracted position;

a punch for driving a clip, said punch attached to said drive shaft and translatable thereby between a retracted position and a projected clip fastening position;

clip ejection means for positioning a clip in the path of the punch means intermediate the retracted position and clip fastening position;

first and second gates pivotally attached to the mounting frame in opposed relation on opposite sides of the path of travel of the punch, one of said gates including a die for cooperation with said punch, said gates being pivotal between a closed position for clip attachment and an open position for release of clip material; and

first and second parallel linkage arms, each arm being attached to said drive shaft for movement parallel with the



punch on opposite sides thereof, said first arm including cam drive means cooperative with the first gate to pivotably drive said gate from the open position to the closed position, the second arm including cam drive means cooperative with the second gate to pivotally drive said second gate from the open position to the closed position, said die being cooperative with the punch when the gates are both in the closed position to form a clip about material positioned and gathered by action of closing said gates.

4,001,927

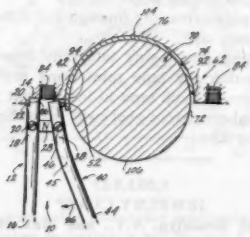
HAND TOOL FOR REMOVING A MOVABLE MEMBER FROM A CONFINED SPACE ADJACENT A FIXED MEMBER

Norman Edward Enderle, 4400 Glenn Cannon St., Bakersfield, Calif. 93308

Filed Sept. 2, 1975, Ser. No. 609,586

Int. Cl.² B25B *27/02*

U.S. Cl. 29—267 **2 Claims**



1. A main bearing removal device for use with an engine having a block with at least one arcuate bearing seat, a crankshaft having a journal surface adjacent said arcuate bearing seat, an arcuate bearing shell in said arcuate bearing seat

between said bearing seat and said crankshaft journal surface and at least one shoulder on said block adjacent said bearing seat for receiving one end of a bearing cap, said device comprising:

a first lever having a work-engaging end, an intermediate portion and a second end, said second end defining a grip portion, said first end being provided with a flat land and a shoulder for engaging said shoulder on said block, said intermediate portion being provided with an elongated bore;

a second lever having a work-engaging end, an intermediate portion and a second end, said second end defining a grip portion, said work-engaging end being provided with a blade having a major axis which is normal to the major axis of said second lever and which is adapted to engage said arcuate bearing shell, said intermediate portion of said second lever being provided with an elongated, transverse bore;

a link having a first end disposed in said bore in said first lever and a second end disposed in said bore in said second lever;

a first pin pivotably connecting said first end of said link to said first lever; and

a second pin pivotably connecting said second end of said link to said second lever.

4,001,928

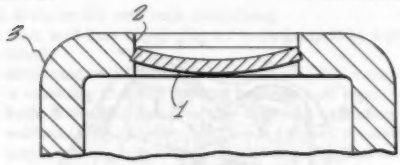
METHOD FOR PLUGGING AN APERTURE WITH A HEAT RECOVERABLE PLUG

Robert J. Schweiso, Los Altos, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Division of Ser. No. 320,930, Jan. 4, 1973. This application June 3, 1975, Ser. No. 583,277

Int. Cl.² B23P *11/02*

U.S. Cl. 29—447 **4 Claims**



1. A method of sealing an aperture comprising inserting into said aperture a heat-recoverable plug, said plug having been deformed from a heat-stable configuration it possesses in its austenitic state to a heat-recoverable configuration which it maintains while in its martensitic state, said plug having a transverse dimension smaller in its heat-recoverable condition than in its heat-stable condition and warming said plug to a temperature above a transition temperature at which it reverts from its martensitic state to its austenitic state whereby the transverse dimension of said plug increases and the circumference of said plug is brought into sealing contact with the walls of said aperture.

4,001,929

METHOD OF CONSTRUCTING A MEDICAL NEEDLE HOLDER ASSEMBLY

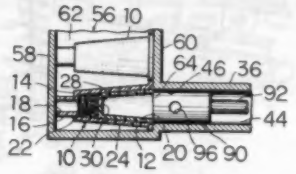
Soji Ishikawa, No. 8-5, 1-chome, Kamata, Setagaya, Tokyo, Japan

Filed Aug. 7, 1975, Ser. No. 602,740

Int. Cl.² B23P *11/02*

U.S. Cl. 29—451 **6 Claims**

1. A method of assembling together a generally tubular needle holder, a filter element composed of a wad of a predetermined length of filament yarn of synthetic resin and a generally tubular filter retainer adapted to be received in said needle holder with said filter element fitted in the needle holder, comprising (1) feeding said needle holder and said filter retainer into respective predetermined positions longitudinally spaced apart from and aligned with each other and feeding said filament yarn into a predetermined position intermediate between said predetermined positions of said needle holder and said filter retainer, (2) producing a unidirectional stream of air flowing from said predetermined position of said filament yarn toward said predetermined position of said filter retainer for moving the filament yarn from said predetermined



position thereof toward the filter retainer in said predetermined position thereof until the filament yarn is forced in the form of a tangle against the foremost end of said filter retainer, (3) moving said filter retainer from said predetermined position thereof toward said needle holder in said predetermined position thereof with said tangle of said filament yarn carried on the foremost end of said filter retainer, and (4) forcing the filter retainer into said needle holder in said predetermined position thereof so that the tangle of the filament yarn is compacted into wad form within said needle holder.

4,001,930

METHOD FOR REDUCING HARMFUL STRESSES IN LAYERS APPLIED BY THERMAL SPRAYING

Eggert Tank, Feilbach, and Franz Pigisch, Beutelsbach, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Dec. 18, 1972, Ser. No. 316,060

Claims priority, application Germany, Dec. 17, 1971, 2162700

Int. Cl.² B23P *3/20*

U.S. Cl. 29—460 **36 Claims**

1. A method for reducing harmful stresses in at least one layer applied on a metallic structural part by thermal spraying, which at least one layer has a thickness which causes the harmful stresses, comprising the step of providing partition members on said metallic structual part to subdivide the at least one layer applied in planes extending perpendicularly to the surface of the metallic structural part so as to reduce the harmful effects of such stresses.

4,001,931

WIRE TERMINATION METHOD

William H. McKee, West Covina, Calif., assignor to TRW Inc., Elk Grove Village, Ill.

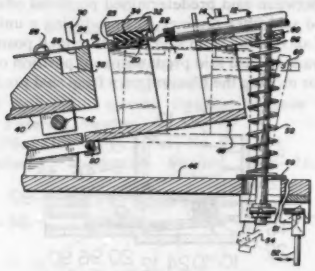
Division of Ser. No. 502,085, Aug. 30, 1974, abandoned. This application June 9, 1975, Ser. No. 585,308

Int. Cl.² H01R *43/04*

U.S. Cl. 29—628 **4 Claims**

1. In a method for simultaneously effecting solderless terminations of a plurality of wires in a multi-wire connector having a wire gripping terminal disposed within each of a plurality of wire-securing channels, the steps comprising spreading said wires to the relative interval to be assumed when terminated in such multi-wire connector, cutting said wires to be terminated to length, maintaining the cut wires in fixed position with the intervals therebetween substantially equal to the intervals between the connector wire-receiving channels, locating a multi-wire connector adjacent said wires with the wire-receiving channels therein in substantial alignment with such positioned wires, effecting relative movement between said connector channels and said wires in a direction transverse to the

longitudinal axes of said wires so as to have said wires enter said channels with which aligned and have wires confined within the channels of said connector, and engaging and driving said wires after said wires are confined within said channels by means of wire-driving means so as to drive said wires into said terminals in said connector channels to effect termination of said wires in said connector terminals.



4,001,932

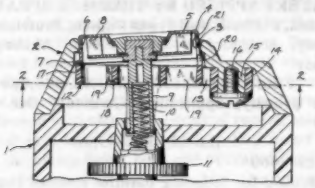
ROTARY SHAVER WITH SHEAR PLATE ROTATION PREVENTING MEANS

Wallace D. Herrick, Grand Rapids, Mich., assignor to Bissell Inc., Grand Rapids, Mich.

Continuation-in-part of Ser. No. 271,798, July 14, 1972. This application Nov. 17, 1972, Ser. No. 307,517

Int. Cl.² B26B *19/16*

U.S. Cl. 30—43.5 **3 Claims**



1. A dry shaver comprising:
a. a shaver housing including a shaving head having at least one opening therein,
b. a shear plate disposed within said opening and adapted for tilting relative thereto and with the edge of said opening forming a fixed outer stop therefor, said shear plate including a cylindrical wall,
c. a floating rotary cutting element disposed within said shear plate and tiltably supporting the latter,
d. a rigid fixed inner shear plate stop member removably secured in said head,
e. and cooperative interlocking means on said shear plate and on said fixed stop member to prevent shear plate rotation at any tilted position thereof during rotation of said cutting member, said interlocking means comprising:
1. recess means comprising at least one notch formed in said cylindrical wall,
2. and a fixed projection formed in said rigid stop member and disposed within said notch, said fixed projection comprising a post of fixed length disposed within said notch throughout the full range of floating shear plate positions,
f. said stop member including an inner transverse planular portion from which said post extends,
g. the length of said post being such that said shear plate will, upon inward floating movement, engage said inner transverse planular portion before said post can bottom within said notch.

3. A dry shaver comprising:
a. a shaver housing including a shaving head having at least one opening therein,
b. a shear plate disposed within said opening and adapted for tilting relative thereto and with the edge of said opening forming a fixed outer stop therefor, said shear plate including a cylindrical wall,
c. a floating rotary cutting element disposed within said shear plate and tiltably supporting the latter,
d. a rigid fixed inner shear plate stop member removably secured in said head,
e. and cooperative interlocking means on said shear plate and on said fixed stop member to prevent shear plate rotation at any tilted position thereof during rotation of said cutting member, said interlocking means comprising:
1. recess means comprising at least one notch formed in said cylindrical wall,
2. and a fixed projection formed in said rigid stop member and disposed within said notch, said fixed projection comprising a post of fixed length disposed within said notch throughout the full range of floating shear plate positions,
f. said stop member including an inner transverse planular portion comprising inner and outer concentric rings which are joined together,
g. said post extending from said outer ring.

4,001,933

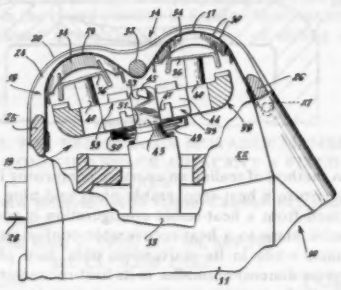
CUTTER DRIVE ARRANGEMENT FOR AN ELECTRIC DRY SHAVER

Peter A. Czerner, Trumbull, Conn., assignor to Sperry Rand Corporation, Bridgeport, Conn.

Filed June 4, 1975, Ser. No. 583,612

Int. Cl.² B26B *19/02*

U.S. Cl. 30—43.92 **12 Claims**



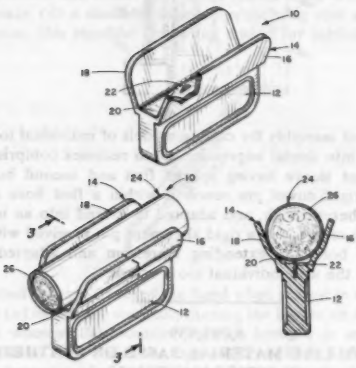
1. An inner cutter drive assembly for an electric dry shaver having cutter drive means for operating an inner cutter relative to an outer cutter, said assembly comprising,
a. a motor driving arm carrying projections thereon;
b. a driven plate member for carrying the inner cutter and adapted for engagement with said driving arm to be driven thereby;
c. spring means disposed on said driving arm and operable to urge the plate member in a direction to resiliently maintain the inner cutter in engagement with the outer cutter;
d. a slot formed in the plate member for slidably receiving the driving arm, the walls of the slot being shaped and dimensioned to prevent rotation of the arm therein; and
e. ledges formed in the walls of the slot for engaging said driving arm to effect driven movement of the plate member, said ledges further being formed to seat the projections of the driving arm thereon to interlock the plate member thereto.

4,001,934

COIN ROLL CUTTER

Robert G. Bell, 300 Rolling Oaks Drive, Apt. 167, Thousand Oaks, Calif. 91360

Filed July 10, 1975, Ser. No. 594,866
Int. Cl.² B25F 3/00; B26B 3/00
U.S. Cl. 30—124 4 Claims



1. A cutter for coin rolls comprising:

a base, said base being adapted to be grasped by a person's hand;

a bifurcated section divided into a first leg and a second leg, a receiving chamber located between said legs;

a knife blade connected to said base and extending within said receiving chamber, said blade adapted to contact the paper roll of a coin roll that is placed within said receiving chamber and as said cutter is moved longitudinally along the coin roll the paper roll is severed, said first leg and said second leg being formed of a material of construction so as to permit automatic deflection of said legs in respect to said base to accomodate different sizes of coin rolls by said legs spreading apart when a larger diametered coin roll is inserted within said receiving chamber and upon removal of the coin roll the legs automatically return to the undeflected state.

4,001,935

ROVING CUTTER

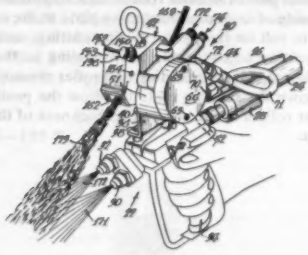
Duane D. Krohn, Westminster, and Samuel W. Culbertson, Arvada, both of Colo., assignors to Binks Manufacturing Company, Franklin Park, Ill.

Filed June 12, 1975, Ser. No. 586,206
Int. Cl.² B26B 17/00; B25F 3/00
U.S. Cl. 30—128 11 Claims

1. A roving cutter comprising an integrated air motor and cutting means driven thereby, characterized by:

a unitary mounting plate located between the air motor and the cutting means, said mounting plate defining part of an air motor rotor cavity on one side thereof and mounting means for the cutting means on the other side thereof.

said air motor including a hollow body having an opening therein mounted on said one side of said plate and defining therewith an air motor rotor cavity, a rotor rotatably mounted in said cavity and having a shaft rotatably supported in and extending through said plate to said other side thereof, air passages in said body and said plate for



conducting compressed air to said cavity for driving said rotor.

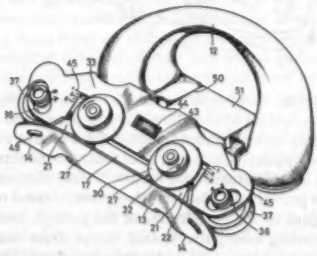
said cutting means including a cutter roller mounted on said shaft at said other side of said mounting plate and driven thereby, a back-up roller rotatably mounted on said mounting plate at said other side thereof in parallel relation to said cutter roller, and means on said other side of said mounting plate for feeding roving between said cutter roller and said back-up roller, said cutter roller cooperating with said back-up roller to cut the roving into short segments.

4,001,936

CARPET CUTTER

Katsumi Matsushita, Sakai, Japan, assignor to Kabushiki Kaisha Toa Interia (Toa Interior Co., Ltd.), Osaka, Japan

Filed Nov. 14, 1975, Ser. No. 631,958
Claims priority, application Japan, Nov. 21, 1974, 49-134566
Int. Cl.² B26B 29/00
U.S. Cl. 30—287 4 Claims



1. A carpet cutter for cutting a carpet to the size or configuration of a room comprising:

a bed plate adapted to be slid on the carpet,

a grip fixedly mounted on said bed plate along the rear edge thereof,

a guide plate extending upward from the front edge of said bed plate and having its ends projecting beyond the ends of said bed plate,

a slanting plate secured on the bed plate in the rear of said guide plate with its lower front edge adjacent to said guide plate,

a blade mounting plate fixedly mounted on said slanting plate at the lower front portion thereof,

an opposed pair of cutting blades mounted on said blade mounting plate at the ends thereof, said blades each being secured in position by tightening a clamping nut on a stud bolt projecting from said blade mounting plate,

a roller mounting plate mounted on said slanting plate at the upper rear portion thereof above said blade mounting plate to be slidable along the surface of the slanting plate, said roller mounting plate forming with said guide plate a space into which the carpet is inserted for cutting,

an opposed pair of presser rollers rotatably mounted on the underside of said roller mounting plate at the ends thereof so as to roll on the carpet during cutting, and

roller position adjusting means providing in the center of said slanting plate for sliding said roller mounting plate up and down the slanting plate to adjust the position of said presser rollers according to the thickness of the carpet to be cut.

4,001,937

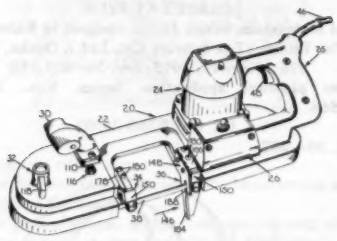
PORTABLE POWER DRIVEN BAND SAW

Charles R. Stelljes, Fayetteville, and Lars Frostad, Syracuse, both of N.Y., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Apr. 28, 1975, Ser. No. 571,969

Int. Cl.² B27B *13/08*

U.S. Cl. 30—380 **7 Claims**



1. A portable, hand-manipulated band saw comprising, a driving pulley and an idler pulley, a continuous band-type saw blade mounted on said pulleys, motor drive means connected to said driving pulley, tension control means connected to said idler pulley, handle means and motor control elements, blade guide means providing a blade cutting plane rotated relative to a plane tangent to the peripheries of the pulleys, and a frame means supporting said pulleys, said motor drive means, said tension control means, said handle means and said blade guide means, said frame means providing cutting capacities wherein blade depth penetration at full width of cut and rip cut width capacity are each at least 50% of the diameter of said pulleys, a pair of blade guide roller assemblies for twisting the blade in order to give greater cutting capacities of said band saw, each said guide roller assembly comprising a pair of roller assemblies at an end of the cutting run of the blade mounted on a roller holder, each said roller assembly comprising a guide and a low friction bearing mounted on a bolt, said guide having stepped outside dimensions, the larger of which is approximately equal to the outer dimension of said bearing, and said roller holder being adjustably fixed to said band saw.

4,001,938

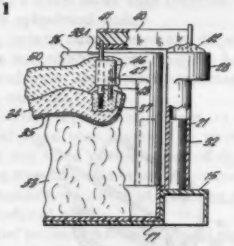
DENTAL RESTORATION JIG

Abraham J. Cooper, 348 Country Club Lane, Pomona, N.Y. 10970

Division of Ser. No. 379,856, July 16, 1973, Pat. No. 3,871,804. This application Dec. 11, 1974, Ser. No. 531,473

Int. Cl.² A61C *13/00*

U.S. Cl. 32—11 **2 Claims**



1. A dowel assembly for casting models of individual tooth impression into dental impression tooth recesses comprising an alignment sleeve having spaced first and second bores therein, a rigid dowel pin received within a first bore and extending therethrough, and adapted to extend into an individual tooth recess, and a rigid alignment pin received within the second bore and extending therefrom and adapted to extend into the said individual tooth recess.

4,001,939

TOOTH-FILLING MATERIAL BASED ON SYNTHETIC PLASTICS MATERIAL

Albert Gross, Frankfurt, Germany, assignor to Kulzer & Co. GmbH, Bad Homburg, Germany

Continuation of Ser. No. 140,279, May 4, 1971, abandoned, which is a continuation of Ser. No. 751,357, Aug. 9, 1968, abandoned. This application Nov. 20, 1972, Ser. No. 308,084

Claims priority, application Germany, Aug. 19, 1967, K 63146

Int. Cl.² A61K *5/06*

U.S. Cl. 32—15 **38 Claims**

1. In a tooth-filling and dental fixing material based on a polymerisable acrylate liquid, an acrylate polymer in powder form, a polymerisation catalyst and an accelerator on the basis of a redox system, the improvement which comprises as a component for said material for increasing adhesion thereof, at least one hydroperoxide of the general formula ROOH or a compound from which such a hydroperoxide is formed in situ, in which R is an optionally substituted alkyl radical, the bonding with the OOH-group being effected by way of a primary, secondary or tertiary carbon atom.

4,001,940

ELASTIC POSITIONER APPARATUS FOR ORTHODONTISTS

Anthony J. Cusato, Closter, N.J., assignor to Henry Mann, Inc., Huntingdon Valley, Pa.

Filed Feb. 19, 1975, Ser. No. 550,983

Int. Cl.² A61C *3/00*

U.S. Cl. 32—40 R **2 Claims**

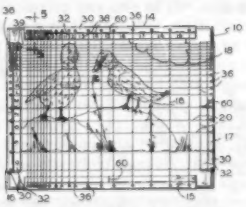
1. An elastic band positioner having a tweezer configuration with two leg members attached at one end and with the other ends of the legs in a free condition, the positioner particularly for use by orthodontists for receiving, mounting and retaining small elastic bands during expansion, positioning and placing of these bands on arch wire retaining brackets, between teeth and for like uses, said band positioner including: (a) a reduced end portion formed on each of the free ends of the legs and of a reduced size, this pair of legs and these ends movable toward and away from each other in a common plane; (b) a contoured configuration formed on each of the ends of the legs and formed so as to be mirror images of each other and when

in a closed side-by-side relationship each leg end provides essentially one-half of an ovoid-shaped configuration whose maximum diameter is easily forced through the passageway of a small elastic band to be mounted and positioned on the closed ovoid-shaped ends of the legs, this ovoid configuration when the legs are in closed condition extending away from the attached ends of the legs and with the curved surface providing a cam and guide for the entrance of the contoured ends to and through the aperture in the elastic bands; (c) a reduced diameter groove formed in the leg ends, this groove immediately adjacent the ovoid configured ends and transverse of a plane bisecting the space between the legs, said groove sized to receive and retain said small elastic band when mounted therein; (d) a shoulder formed on each leg end adjacent this groove, this shoulder providing a stop for inhibiting the unwanted upward travel of the band when placed in said groove, and (e) means for manually moving the legs to an apart condition whereat the mounted band is brought to an expanded condition after which the legs are brought to a closed condition for removal of the band to and on the tooth of the patient, said means including a cam block pivotally carried by one leg of the tweezer and swingable in an arc whose axis is normal to the axis of the leg and in which the other end of the cam block has a cam portion adapted to engage the underside of the opposite leg, this cam block being manipulated from a closed to an open position by means of a manually engaged bar member, one end of said cam block being carried by a spring bar member secured at one end to the leg of the tweezer and with the other end of the spring bar member pivotally retaining and carrying the cam block.

4,001,941
GRAPHIC REPRODUCTION APPARATUS

Gustavo Joel Cruz, 2224 NW. Johnson St., Portland, Oreg. 97210

Filed Apr. 21, 1975, Ser. No. 569,830
Int. Cl.² B43L *13/00*
U.S. Cl. 33—1 K 3 Claims

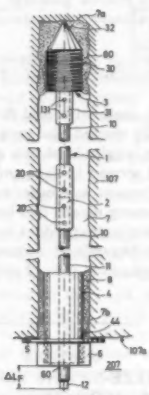


1. In a graphic reproduction apparatus,
canvas means including a rectangular frame and a canvas on the frame,
a plurality of fastening means,
two pairs of elongated, generally C-shaped mounting clips extending over a substantial portion of the frame, said clips having strip-like jaw portions and loop-like spring portions connecting the jaw portions and adapted to temporarily clip to the front and back of the two pairs of opposite edge portions of the frame and rigidly secured to and each clip carrying a plurality of spaced apart fastening means,
and a plurality of highly stretchable elastic strings each secured under tension to a pair of the fastening means, on the opposite clips the strings extending at right angles to each other to form a grid over the canvas, whereby the strings can be temporarily deflected to clear an area on the canvas for working thereon.

4,001,942
ROD EXTENSOMETER

Fritz Schuermann, Hattingen; Herbert Müller, and Horst Böddicker, both of Essen, all of Germany, assignors to Bergwerksverband GmbH, Essen, Germany

Filed May 29, 1975, Ser. No. 582,417
Claims priority, application Germany, May 30, 1974, 2426088
Int. Cl.² G01B *5/00*
U.S. Cl. 33—125 B 6 Claims



1. An extensometer for mounting in a bore having an outer end portion at the face of a mass of rock, ore, or similar material and an inner end portion remote from said outer end portion, said extensometer serving to measure the shifting of said material and comprising: an elongated rigid rod extending between said end portions and comprised of a plurality of aligned rod sections and at least one sleeve rotationally rigidly coupling said sections together, said rod having an inner end at said inner end portion and an outer end at said outer end portion; a head fixed on said inner end and integrally formed with a threaded external surface and with a generally conical tip turned away from said outer end, said head being adapted to be fixed at said inner end portion and said tip being adapted to break an adhesive cartridge; a sleeve spacedly surrounding said outer end and adapted to be fixed in said outer end portion remote from said head; a washer surrounding said sleeve and lying against said face; means including a nut threaded on said sleeve and bearing on said washer for pressing same against said face, said outer end projecting through said washer, said sleeve, and said means; and a polygonal formation on said outer end engageable by a tool for rotation of said head.

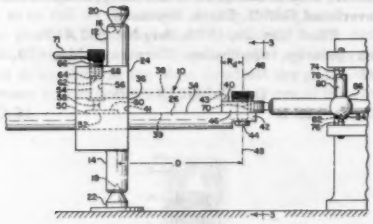
4,001,943
VARIABLE INVOLUTE DISC GAUGE

Henry J. Flair, Franklin Park, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Jan. 30, 1976, Ser. No. 653,914
Int. Cl.² G01B *05/00*
U.S. Cl. 33—174 R 8 Claims

1. An involute checking gauge for verifying that a gear checking instrument is operational for use with a multitude of gear base diameters over a predetermined range of base diam-

eters wherein said instrument includes a rotation means which provides rotation of an object in engagement therewith about an axis of rotation, and a sensing means; and said gauge comprises engagement means for engaging said rotation means so that said gauge is rotated by said rotation means, said engagement means including a section having a passageway therethrough and a first substantially flat surface, substantially parallel to the axis of rotation of said rotation means, an elongated arm slideably extending through said passageway and having a substantially flat second surface that makes



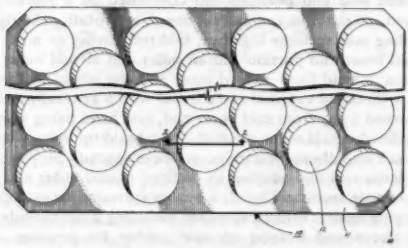
substantially a right angle with said first surface, and a substantially cylindrically shaped disc secured to an outer end of said arm so that the longitudinal axis of said disc is substantially normal to said second surface and so that the periphery of said disc extends beyond said outer end of said arm and into contact with said sensing means and locking means for selectively locking said arm so that it does not move relative to said section when a predetermined distance between said first surface and the longitudinal axis of said disc has been established.

4,001,944

FREEZE-DRYING PROCESS

David C. Williams, Royal Oak, Mich., assignor to Parke, Davis & Company, Detroit, Mich.

Filed Aug. 25, 1975, Ser. No. 607,306
Int. Cl.² F26B 5/06
U.S. Cl. 34—5 6 Claims



1. The process of freeze-drying parenteral aqueous liquid by means of a tray-shaped unitary block of heat-conducting metal having a plurality of spaced cavities therein each adapted to receive a container supported in a close fit so that the spacing between the containers is occupied substantially only by the heat-conducting metal, comprising the steps of

distributing said liquid within containers in cavities of the block to a depth such that for heat transfer the body of liquid in each container is substantially confined within the block,

subjecting the block to nitrogen bath cooling to freeze the liquid in a short period less than about one hour, thereby freezing the liquid in each container at substantially the same rate,

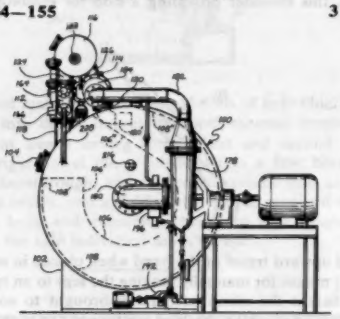
and drying the frozen product under vacuum while confined within the block so that the frozen product in each container is dried in less than about 4½ days at substantially the same rate.

4,001,945

WET PROCESSING MEANS

Christoph W. Aurich, Clemson, S.C., and James Keith Turner, Lincolnton, N.C., assignors to Gaston County Dyeing Machine Company, Mount Holly, N.C.

Division of Ser. No. 381,268, July 20, 1973, Pat. No. 3,921,420, which is a continuation-in-part of Ser. No. 318,087, Dec. 26, 1972, abandoned. This application Sept. 24, 1975, Ser. No. 616,152
Int. Cl.² F26B 13/00
U.S. Cl. 34—155 3 Claims



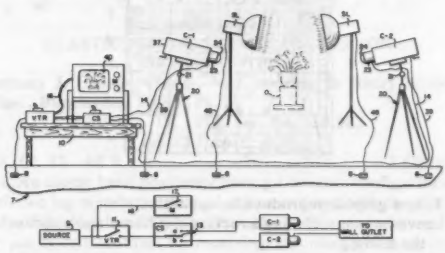
1. In apparatus adapted for wet processing textile strand material in which means is included for causing the strand material to circulate in traveling strand form to and from a pleated accumulation within an enclosure for such processing, the improvement which comprises an extraction jet disposed between the point of strand circulation from said pleated accumulation and said circulating means for subjecting the circulating strand material to an aspirating influence directed oppositely to the direction of strand material circulation, means for selectively supplying an inert gas to said jet to generate an aspirating influence thereat for extracting said strand material following wet processing and means for application of a suction influence ahead of said extraction jet.

4,001,946

TELEVISION EDUCATIONAL GAME

Luke Procopio, 239 Windsor Way, Hillside, N.J. 07205

Filed Feb. 18, 1975, Ser. No. 550,873
Int. Cl.² G09B 5/00
U.S. Cl. 35—8 R 11 Claims



1. A training device and game for simulating the televised production of a television show which comprises: a source of energy

miniature components in the form of and simulating components employed in a television production, said simulated miniature components including

a video tape recorder,

means for connecting said video tape recorder to a source of energy,

a monitor cooperatively associated with said video tape recorder,

a camera switch cooperatively associated with said connecting means,

at least one camera responsive to the activation of said camera switch, and

an object to be televised by said camera.

4,001,947

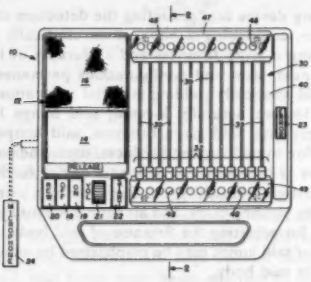
TEACHING SYSTEM

Jack S. Kilby, 7723 Midbury, Dallas, Tex. 75230

Continuation of Ser. No. 154,493, June 18, 1971, abandoned. This application Aug. 16, 1973, Ser. No. 388,884

Int. Cl.² G09B 7/02

U.S. Cl. 35—9 B 3 Claims



1. The teaching system comprising:

first record means for storing signals including audio signals and data signals,

second means for recording a question on the record means,

third means under the control of a teacher for recording a data signal on the record means representative of the correct multiple character alphanumeric answer including

a predetermined number of reusable alphanumeric character display means each controlled by an independently movable character selector and each being capable of displaying any one of the entire set of selectable characters to the teacher, each being capable of displaying the selected character to the teacher until changed by movement of the respective selector, and

means for producing an encoded data signal representative of a character represented by the position of the respective selector,

fourth means for reproducing the signals stored on the record means as electrical signals,

fifth means for converting the electrical signals to audio signals to pose the question to a student,

sixth means under the control of a student for composing a multiple character alphanumeric answer including

a corresponding number of reusable alphanumeric character display means each controlled by an independently movable character selector and each being capable of displaying any one of the entire set of selectable characters to the student until changed by movement of the selector, and

encoding means for producing a signal representative of the position of each of the selectors, and

seventh means for comparing the encoded answer and the answer represented by the data signal.

4,001,948

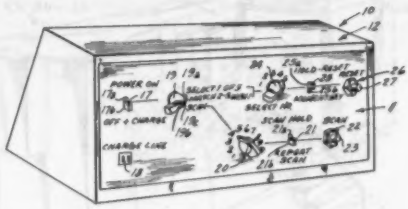
LIGHT RESPONSE TEACHING SYSTEM

Stanley Wolfe, P.O. Box 205, Booneville, Ark. 72927

Filed Sept. 29, 1975, Ser. No. 617,836

Int. Cl.² G09B 7/06

U.S. Cl. 35—9 R 8 Claims



1. A light response teaching device adapted for training pupils by selectively illuminating a plurality of learning indicia cards, comprising:

a. a display circuit means having illumination means adjacent a plurality of panels for illuminating a single learning indicia card received by each panel;

b. scanning circuit means for causing said illumination means to sequentially illuminate said learning indicia cards according to a pre-arranged pattern;

c. match and select circuit means having a panel select switch and also including a card selection switch adjacent each of said panels,

i. said match and select circuit means causing said display circuit means to illuminate the panel preselected by said panel select switch when one of said card selection switches is activated by the pupil, and

ii. said match and select circuit means also causing one of said panels to remain illuminated and causing said display means to illuminate one of the other panels preselected by said panel select switch when one of said card selection switches is activated by the pupil;

d. a mode selection circuit means connected to said display circuit means, scanning circuit means, and match and select circuit means and being effective to alternately preselect a matching, selecting, and scanning mode of operation; and

e. power supply means connected to at least one of said display, scanning, match and select, and mode selection circuit means for supplying power to all of said circuit means.

4,001,949

DYNAMIC FIRE SIMULATOR AND TRAINER

David N. Francis, Marinette, Wis., assignor to The Ansul Company, Marinette, Wis.

Filed May 9, 1975, Ser. No. 576,218

Int. Cl.² G09B 9/00

U.S. Cl. 35—10 12 Claims

1. A method of providing realistic on-line fire responses in accordance with the accuracy of an on-line fire fighting sequence employed by a fire fighter, comprising the steps of:

dynamically simulating the image of an actual fire;

projecting said simulated fire image on a screen;

establishing a predetermined fire fighting sequence to be followed by the fire fighter for properly extinguishing the simulated fire;

loading said predetermined fire fighting sequence in the memory of a computer;

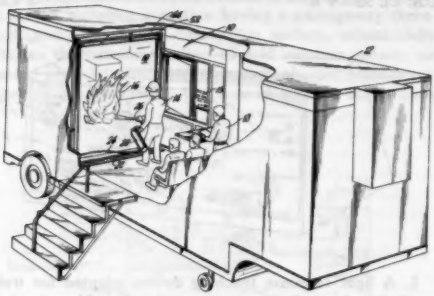
applying an input to said image projected on said screen in accordance with the on-line fire fighting sequence employed by the fire fighter in fighting said simulated fire;

monitoring said on-line fire fighting sequence employed by the fire fighter in fighting said simulated fire;

determining the points of application of said on-line input by said fire fighter;

supplying data to said computer in accordance with said on-line fire fighting sequence employed by said fire fighter;

comparing said actual fire fighting sequence and said points of application of the on-line input by the fire fighter with



the predetermined fire fighting sequence stored in the computer; and

changing the projected image of the simulated fire in accordance with the on-line input of the fire fighter and the predetermined fire fighting sequence stored in the computer.

4,001,950

RESUSCITATION TRAINING APPARATUS

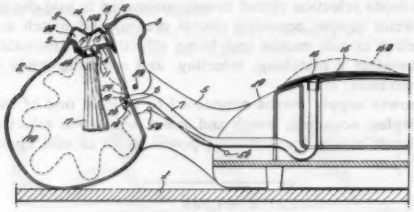
Hans Christian Blumensaadt, Virum, Denmark, assignor to Testa-Laboratorium A/S, Copenhagen, Denmark

Continuation-in-part of Ser. No. 178,362, Sept. 7, 1971, abandoned. This application Mar. 12, 1973, Ser. No. 340,383

Claims priority, application Sweden, Feb. 26, 1971, 12211/71; Apr. 10, 1972, 4603/72

Int. Cl.² G09B *23/28*

U.S. Cl. 35—17 **38 Claims**



1. Apparatus for practicing resuscitation, comprising: a simulated head portion including a shell enclosing a cavity and having an air opening and an outlet opening, a mask detachably covering said shell adjacent said air opening and having an opening communicating with said air opening, said shell and said mask providing members of said simulated head portion, an air-impervious collapsible bladder extending into said cavity and having a portion with a bladder opening, said bladder being held by at least one of said members with the bladder opening in communication with the opening in said mask, and lung simulating means offering resistance to insufflation corresponding to the resistance of the human lungs to insufflation and responsive to air displaced from said cavity through said outlet opening by insufflation of said bladder for indicating proper insufflation, said apparatus having a primary air system including said bladder and a secondary air system including said lung simulating means responsive to air displaced from said cavity, said bladder separating the primary air system from the secondary air system and being formed to be filled with air to a volume without offering appreciable resistance at least as large as required to cause said lung simulating means to indicate proper insufflation, whereby a rise in air pressure in the primary air system is transferred without appreciable loss to said secondary air system to provide uniformity of operation for indicating proper insufflation by any user of said apparatus.

4,001,951

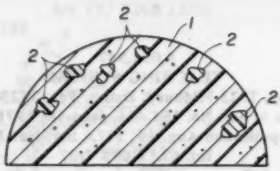
BREAST CANCER DETECTION TRAINING DEVICE

Wolfgang G. Fasse, 2556 Legion St., Box K, Bellmore, N.Y. 11710

Filed Mar. 25, 1975, Ser. No. 561,791

Int. Cl.² G09B *23/30*

U.S. Cl. 35—17 **10 Claims**



1. A training device for facilitating the detection of human breast cancer, comprising a body of an elastically yielding material having a given firmness and a plurality of lumps of varying hardness, sizes and configurations permanently embedded in said elastically yielding material at locations where cancer nodules are naturally located, said lumps having a firmness larger than said given firmness, said lumps further resembling, due to said varying hardness, sizes, and configurations, nodules of breast cancer cells said device further comprising an air-tight elastically yielding envelope surrounding said elastically yielding body, and air supply means connected to said body for adjusting the firmness of said body, whereby the location of said lumps may be emphasized by adjusting the air pressure in said body.

4,001,952

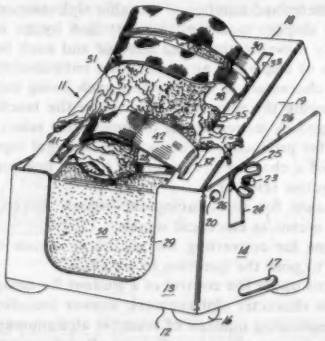
HYSTEROSCOPY TEACHING AID

Trygve M. Kleppinger, 1300 Lancaster Pike, Reading, Pa. 19607

Filed Oct. 24, 1975, Ser. No. 625,384

Int. Cl.² G09B *23/30*; A61G *13/00*

U.S. Cl. 35—17 **14 Claims**

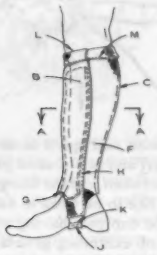


1. An anatomical display device comprising a box-like base having upstanding front and side walls, a stage member pivoted to the upper front corner portions of the side walls, means to clamp the stage member in pivotally adjusted position, and flexible strap means connected to opposite side marginal portions of the stage member for holding an anatomical specimen on the stage member.

4,001,953
PROTECTIVE GAITER

Albert Lee Fugere, 4901 - 17th Ave. S., Seattle, Wash. 98108, and Michael Joseph Kelly, 808 NE. 82nd, Seattle, Wash. 98115

Continuation-in-part of Ser. No. 461,156, April 15, 1974, abandoned. This application Feb. 24, 1975, Ser. No. 552,551
Int. Cl.² A41D 17/00, 13/00
U.S. Cl. 36—2 R 11 Claims

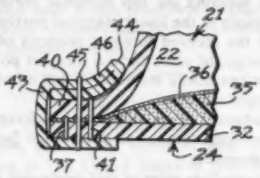


1. A protective gaiter, comprising:
an elongated first fabric section having an outline which includes an upper edge, a lower edge and two longitudinal edges extending therebetween, said lower edge comprising two straight edge portions and an intermediate edge portion, said intermediate edge portion being concavely shaped, said lower edge being adapted to extend over a portion of a wearer's foot when the gaiter is in place on the wearer's leg;
a second fabric section substantially identical in outline to said first fabric section;
means securing said first fabric section to said second fabric section substantially around the respective outlines thereof, thereby defining a completely enclosed pocket between said first and second fabric sections;
a third fabric section having upper and lower edges and two longitudinal edges extending therebetween;
means securing one longitudinal edge of said third fabric section along the length thereof to one longitudinal edge of said first and second fabric sections, and means securing the other longitudinal edge of said third fabric section along the length thereof to the other longitudinal edges of said first and second fabric sections, said third fabric section, when so secured to said first and second fabric sections, extending from the upper edge of said first and second fabric sections to a point just above said intermediate edge portion of the lower edge of said first and second fabric sections;
an elastic strap secured to and extending between opposing ones of said straight edge portions of the lower edge of said first and second fabric sections; and
an energy-absorbing pad, having an outline similar to the outlines of said first and second fabric sections, said pad having a lower edge which includes two straight edge portions and an intermediate edge portion, said intermediate edge portion being concavely shaped, said intermediate edge portion being configured to mate with said intermediate edge portions of said first and second fabric sections such that with said protective gaiter operatively positioned about the wearer's leg, the shinbones of the wearer are covered by said pad.

4,001,954
SHOE CONSTRUCTION

Kennedy G. Taylor, Jr., Nashville, Tenn., assignor to Genesco, Inc., Nashville, Tenn.

Filed May 19, 1975, Ser. No. 578,483
Int. Cl.² A43B 9/10, 13/28
U.S. Cl. 36—16 6 Claims

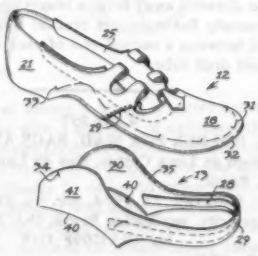


1. In a shoe construction,
a. an insole having a top face, a bottom face, an outer edge, a forepart, a forepart marginal portion, and a backpart,
b. a first padded member substantially coextensive with and covering the top face of the forepart of said insole,
c. a cover sheet over said first padded member and coextensive with the forepart of said insole,
d. a first line of cover stitching securing the margin of said cover sheet to the forepart marginal portion of said insole and being spaced inward approximately 1/16th of an inch from the outer edge of said insole,
e. an upper having a forepart marginal flange fitting flush against said forepart marginal portion,
f. an elongated binding tape extending the length of said forepart marginal flange,
g. said tape being folded about its longitudinal axis over the free edges of said forepart marginal portion and flange, said folded tape having a lower portion covering said forepart marginal portion and an upper portion covering said forepart marginal flange,
h. a second line of stitching securing together the upper portion of said tape, said forepart marginal flange, said cover sheet, said forepart marginal portion of said insole, and the lower portion of said tape, said second line of stitching being spaced inward from said first line of stitching,
i. an outsole fitting against said insole and having a marginal portion fitting against said lower portion of said folded tape, and
j. means securing said outsole to said insole.

4,001,955
MUDGUARD STYLE SHOE CONSTRUCTION

Newton C. Turner, Jr., Nashville, Tenn., assignor to Genesco, Inc., Nashville, Tenn.

Filed Oct. 28, 1975, Ser. No. 620,873
Int. Cl.² A43B 7/14, 23/00
U.S. Cl. 36—96 5 Claims



1. In a shoe construction,
a. an upper member comprising an upper and a discrete

mudguard piece, said upper member having a forepart, an intermediate portion, and opposite sides,

b. said upper having a forepart lower marginal portion, intermediate lower marginal portions on opposite sides, and a backpart portion,

c. said mudguard piece having a top marginal portion extending throughout its forepart and intermediate sides,

d. means securing the top marginal portion of said mudguard piece to the lower marginal portions of said upper, so that the secured forepart portions of said upper and said mudguard piece form a forepart pocket,

e. at least one insole member having a bottom face within said upper member,

f. said mudguard piece having spaced forepart bottom marginal portions secured to the bottom face to one of said insole members,

g. the intermediate sides of said mudguard piece comprising side flaps having abutting bottom edges,

h. means securing said abutting bottom edges together,

i. a forepart outsole,

j. means securing said forepart outsole to the forepart bottom marginal portions of said mudguard piece, and

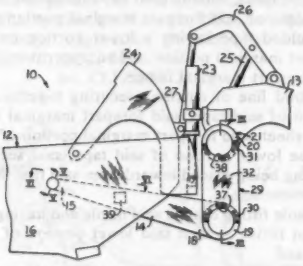
k. heel means fixed to the backpart portion of said upper.

4,001,956

TRACTOR SCRAPER TRANSPORTATION AND ASSEMBLY THEREFOR

Eugene M. Wilson, and William T. Girard, both of Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 17, 1975, Ser. No. 614,052
Int. Cl.² E02F *3/62*
U.S. Cl. 37—129 **13 Claims**



1. A transported tractor scraper of the type having a scraper bowl connected to a tractor, comprising:

1. A laterally extending draft tube disposed longitudinally between said tractor and said scraper bowl;

2. Spacer means mounted interiorly on respective sidewalls of said scraper bowl;

3. A pair of draft arms each having a first end thereof detachable mounted interiorly on said spacer means a spaced distance away from a respective sidewall; and

4. A generally flat transport bracket detachably interconnected between a second end of each of said draft arms and said draft tube.

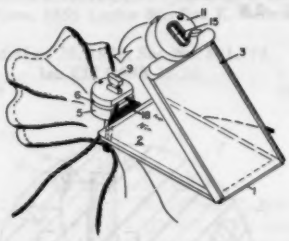
4,001,957

LABEL HOLDER FOR MAIL BAGS AND THE LIKE

Eduardo Neto de Lima Castro, Rua do Lavradio 162, Rio de Janeiro, Brazil

Filed Oct. 23, 1974, Ser. No. 517,350
Claims priority, application Brazil, Oct. 24, 1973, 8295
Int. Cl.² G09F *3/18*
U.S. Cl. 40—10 R **17 Claims**

1. A label holder attachable by a string or the like to mailbags, luggage or the like comprising a first part cooperable with a second part for holding a label therebetween, said first part having integrally formed at one end thereof a fixed spool having a recess within which a portion of said string or the like may be wound, said second part including integrally therewith a cap part having an inner surface corresponding in shape substantially to the outer surface of said spool for closure over the latter to confine a string positioned within said recess, said first and second parts including means permitting them to be



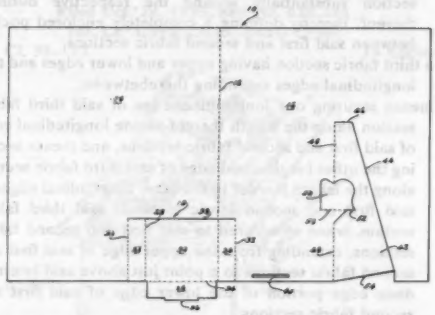
sealed together with said spool received within said cap part when said first part and said second part are closed for holding said label therebetween, means being provided for permitting the string or the like to be fixed to said first part in the region of said spool, said cap part having an inner side wall surface provided with a rib extending generally parallel to the axis of said cap, and said spool has an outer side surface formed with a slot adapted to receive said rib.

4,001,958

"TAKE-ONE" DISPLAY CARD

Francis D. Fecko, Aurora, Ohio, assignor to The A. L. Garber Company, Ashland, Ohio

Filed Mar. 29, 1976, Ser. No. 671,499
Int. Cl.² G09F *1/06*
U.S. Cl. 40—124.1 **2 Claims**

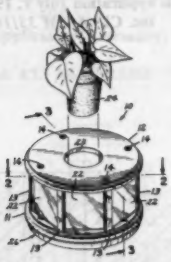


1. A display card having all elements thereof embraced in a single sheet of material and folded to form a front panel and a rear panel, said panels being positioned in contiguous back-to-back relationship, a pocket positioned forwardly and normal to said front panel and formed from said sheet and defined by folds in said rear panel and said front panel, said pocket having a bottom panel formed substantially normal to said front panel, and means on said bottom panel to secure said bottom panel to said rear panel; a foot formed from said back panel, hinged thereto and having a free edge, and being positioned substantially normal to said back panel, said front and back panels secured back-to-back by a suitable means.

4,001,959
ROTARY PICTURE FRAME

Russell S. Grendahl, P.O. Box 115, Pennock, Minn. 56279

Filed July 23, 1975, Ser. No. 598,531
Int. Cl.² G09F 1/12
U.S. Cl. 40—152.1 8 Claims

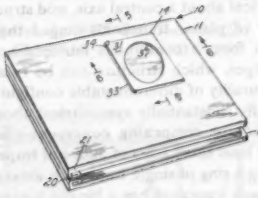


1. A decorative picture frame comprising, in combination:
a generally flat base having a predetermined outline;
a plurality of elongated spacers having first ends secured to said base at intervals around the outline thereof;
a generally flat top having an outline similar to that of said base and a generally central aperture;
fastening means removably securing said top to second ends of said spacers to define with said spacers and said base a three-dimensional hollow body having a top opening, for receiving an ornamental object, and a plurality of peripheral openings, for receiving pictures to be displayed, each said peripheral opening being defined by a portion of said base, a portion of said top, and apposed edges of a pair of said spacers;
sets of inner and outer parallel, spaced grooves extending along apposed portions of pairs of said spacers between said base and said top, and oriented to lie in a set of predetermined geometrical surfaces;
picture supporting means in said inner grooves;
and picture protecting means in said outer grooves, so that a picture to be displayed may be inserted between said supporting means and said protecting means.

4,001,960
PHOTO ALBUM COVER WITH FRAMED INSERT

Sheldon Holson, Norwalk, Conn., assignor to The Holson Company, Wilton, Conn.

Filed Mar. 16, 1976, Ser. No. 667,399
Int. Cl.² B42D 3/00
U.S. Cl. 40—159 3 Claims

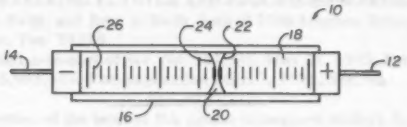


1. In combination, a photo album cover and a frame element engaged therewith; said cover having a principal plane and comprising a plurality of laminated layers, said cover having a through opening extending perpendicular to the plane thereof of given size and configuration, and having outer and inner planar surfaces; said frame element including a generally planar outer wall having an opening therein, said wall being bordered by a beaded edge; side walls communicating with said beaded edge, and flange members carried by said side walls and lying in a plane substantially parallel to said outer wall, said side walls of said frame element corresponding in size and configuration to that of said opening in said cover; said frame element defining a recess between said side walls thereof, and a member maintained in said recess to underlie said opening in said outer wall thereof; said frame element being engaged within said opening such that said beaded edge overlies said outer surface of said cover in the area bordering said opening, and said flange members engage said inner surface of said cover, whereby said frame element is positively retained in said through opening.

4,001,961
ROUND COUNTER

Curtis D. Johnson, and Hal E. Weidner, both of Davenport, Iowa, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 3, 1975, Ser. No. 610,028
Int. Cl.² F41C 27/00
U.S. Cl. 42—1 E 5 Claims

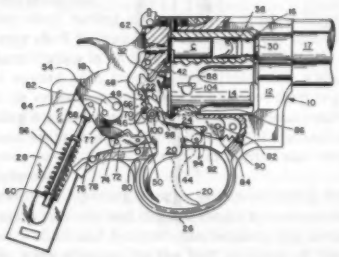


1. A weapon having parts capable of mechanical movement in the firing of said weapon,
a weapon buffer, a transducer on said weapon buffer, and an electrochemical elapsed time meter indicator with counter circuitry for indicating the number of cycles a mechanical movement and hence the firing of said weapon to which said indicator and said circuitry are attached, and transducer means on said weapon buffer for actuating said indicator.

4,001,962
CYLINDER-INDEXING MEANS FOR REVOLVERS

Richard L. Baker, Wallingford, Conn., assignor to The Leisure Group, Inc., Los Angeles, Calif.

Filed Nov. 25, 1974, Ser. No. 526,719
Int. Cl.² F41C 19/00
U.S. Cl. 42—67 6 Claims



1. In a revolver having a frame, a barrel mounted on said frame, a cylinder with a plurality of cartridge chambers disposed at equal angles about its central axis, said cylinder being mounted on said frame for rotation about said axis, means for indexing said cylinder in order to move each chamber in sequence into alignment with said barrel, said cylinder having a plurality of equally spaced notches corresponding in number to said chambers disposed circumferentially about its periphery, a cylinder lock mounted on said frame for reciprocal movement into and out of locking engagement with said notches and means for urging said cylinder lock into engage-

ment with said notches, said notches being disposed relative to said chambers such that when said lock is fully engaged within one of said notches a corresponding one of said chambers is aligned with said barrel, the improvement in said cylinder-indexing means comprising

ratchet means for rotating said cylinder in sequence through a predetermined arc,

said indexing means further including a cam-surface on said cylinder lock disposed for engagement with the leading edge of each of said notches,

said cylinder being rotated by said ratchet means through said predetermined arc to a position at which said cam-surface engages the leading edge of each of said notches in sequence,

said cam-surface facing in the general direction of rotation of said cylinder and being inclined at an angle to the radius of said cylinder at said leading edge such that upon engagement of said cam-surface by the leading edge of any one of said notches, said cylinder is rotated by said means urging said cylinder lock into engagement with said notches until said lock is fully registered with said one notch.

4,001,963

FISH DART

Minton W. Hamsley, 127 Centre Ave., East Rockaway, N.Y. 11518

Filed Nov. 6, 1975, Ser. No. 629,383

Int. Cl.² A01K *81/04*

U.S. Cl. 43—6 **4 Claims**

1. A fish dart, comprising

a substantially oval shaped weighted body having an axis, a length extending along the axis and spaced opposite first and second ends on its axis defining its length;

a barbed member extending from the first end of the body coaxially with said body; and

an eye member extending from the second end of the body coaxially with said body for affixing a fishing line to said fish dart, said barbed member and said eye member being integrally formed with said body and each of said barbed member, said eye member and said body being stationary relative to the others.

4,001,964

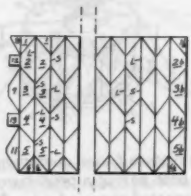
POLYHEDRAL ANNULAR STRUCTURES, AND BLANKS THEREFOR

Rea Ferdinand Hooker, 170 W. 74th St., New York, N.Y. 10023

Continuation-in-part of Ser. No. 355,037, April 27, 1973, Pat. No. 3,894,352. This application July 7, 1975, Ser. No. 593,552

Int. Cl.² A63H *33/16*

U.S. Cl. 46—1 L **12 Claims**



1. A polyhedral structure which is radially substantially symmetrical about a central axis, said structure comprising a number of planar trapezoids hinged together at their sides so as to form a continuous multiplanar toroidal web having two edges, which structure can be rotated, about its core, into a plurality of different stable configurations each of which is radially substantially symmetrical about said central axis, said structure comprising congruent plane trapezoids arranged in an least three rows of adjacent trapezoids, each of said rows being a ring of single trapezoids arranged in alternation so that each trapezoid has a hinged longer side in common with one of its two neighbors of its row and has a hinged shorter side in common with the other of its neighbors of its row, said rows interfitting so that each trapezoid of each row has a side in common with a trapezoid of the adjacent row, the longer and shorter common sides within a row being respectively, infold and outfold hinges arranged within planes which radiate from and include said axis and the sides which adjacent rows have in common being outfold hinges.

7. A flat blank of sheet material, said blank having means, including score lines at which said blank can be folded and edges adapted to be secured together to form a continuous web after said blank is folded at said score lines, for converting said blank to a polyhedral structure which is radially substantially symmetrical about a central axis, said structure comprising a number of planar trapezoids hinged together at their sides so as to form a continuous multiplanar toroidal web having two edges, which structure can be rotated, about its core, into a plurality of different stable configurations each of which is radially substantially symmetrical about said central axis, said structure comprising congruent plane trapezoids arranged in at least three rows of adjacent trapezoids, each of said rows being a ring of single trapezoids arranged in alternation so that each trapezoid has a hinged longer side in common with one of its two neighbors of its row and has a hinged shorter side in common with the other of its nieghbors of its row, said rows interfitting so that each trapezoid of each row has a side in common with a trapezoid of the adjacent row, the longer and shorter common sides within a row being, respectively, infold and outfold hinges arranged within planes which radiate from and include said axis and the sides which adjacent rows have in common being outfold hinges, said score lines being situated so that, on folding, they form the boundaries of said trapezoids.

4,001,965
CONNECTOR FOR USE WITH STRUCTURAL-FOAM ELEMENTS

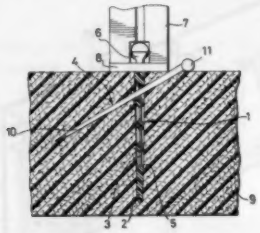
Artur Fischer, Altheimer Str. 219, D-7241 Tumlingen, Germany

Continuation-in-part of Ser. No. 487,806, July 11, 1974, Pat. No. 3,960,460. This application Aug. 8, 1974, Ser. No. 495,842

Claims priority, application Germany, Sept. 5, 1973, 2344713

Int. Cl.² A63H *33/08*

U.S. Cl. 46—23 **9 Claims**



1. A connector for connecting elements of a toy construction kit to structural-foam elements, conprising a first elongated member having a first portion provided with a substantially flat blade-shaped leading end adapted to cut a slit-like incision in a structural-foam element when said first portion is pushed therein and with a trailing portion, said first portion being provided with a plurality of holes spaced in the direction of said elongation from each other and respectively extending transversely to said direction in substantially parallel planes, said first member further having at said trailing end a second portion of a shape adapting it to serve as a stop when said first portion is pushed into said structural-foam element; a connecting element provided on said second portion and, when said first portion is pushed into a structural-foam element, being accessible at the exterior thereof for connection to a cooperating connecting portion of an element of a toy construction kit; a second member having a second substantially flat blade-shaped portion adapted to cut a slit-like incision in said structural-foam element when said second member is pushed therein transversely of said first member and to pass through any of said holes, so as to anchor said first member in said structural-foam element without causing crumbling of the material of the latter.

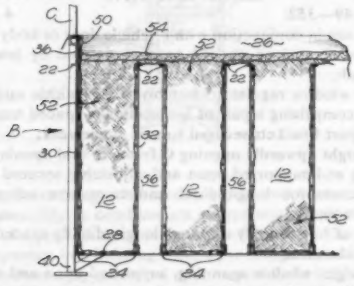
4,001,966
GROWING TRAY STRUCTURE, AS FOR MUSHROOMS

Rudolf Paul Metzner, 6234 N. Irwindale Ave., Azusa, Calif. 91702

Filed Oct. 3, 1973, Ser. No. 403,237

Int. Cl.² A01G *1/04*; B65D *21/02*

U.S. Cl. 47—1.1 **9 Claims**



1. A bed structure to receive growing medium, as for use in the production of mushrooms or the like, comprising:

a plurality of walled container sections for holding said growing medium, each having one side defining a substantial opening for receiving said medium for containment, said sections extending away from said opening to a distance of at least 20 inches;

means for affixing said walled container sections together in vertically spaced-apart relationship with said openings horizontally disposed whereby to permit air flow around individual of said container sections; and

means defining a common space above the openings of said walled container sections for containing a quantity of said casing media whereby mushrooms may be grown in a continuous horizontal bed, supported by spaced-apart quantities of said growing medium in said container sections.

4,001,967
SELF-WATERING PLANTER AND PROCESS OF MAKING

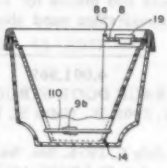
June H. Swift, and John A. Swift, both of 2740 Mayhew Drive, Dallas, Tex. 75228

Continuation-in-part of Ser. No. 362,535, May 21, 1973, Pat. No. 3,903,644. This application Mar. 7, 1975, Ser. No. 556,409

The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.

Int. Cl.² A01G *27/00*

U.S. Cl. 47—80 **11 Claims**



1. An all plastic, vacuum operated, automatically controlled, self-watering planter structure, comprising:

a. an inner shell containing soil medium, gravel or the like and having a square bottom plate and upwardly tapering side walls terminating in an inverted channel of square plan configuration,

b. an outer shell having a square bottom plate larger than said inner shell bottom plate and upwardly tapering side walls terminating in an ipen end of compatible dimension to said square plan configuration, said side walls being smaller in cross-section than the channel they engage,

c. a bonding means consisting of lacquer thinner joining said outer and inner shells in the vertex of said channel in such a manner as to define a vacuum-tight water reservoir therebetween,

d. a plurality of opening means communicating between said water reservoir and the soil medium compartment of said inner shell and located intermediate the corners of the side walls adjacent to the bottom plate of the inner shell and being so restricted in size, quantity and location as to meter water along a gradient created by the capillary action of the soil medium in response to evapotranspiration, through one or more of said opening means from said reservoir into said inner shell when air enters to partially satisfy a partial vacuum in the reservoir through at least one of the other similar restricted opening means into said vacuum-tight water reservoir,

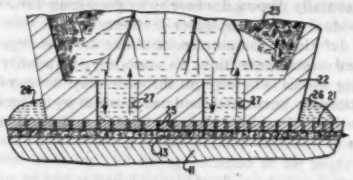
e. the product of said opening means in thousandths of an inch in diameter times the number of said opening means being within the arbitrary numbers range of 60 to 140 inclusive.

4,001,968

SOIL IRRIGATION SYSTEM AND METHOD

Evert S. Green, 14 Kenneth Ave., N. Bellmore, N.Y. 11710

Filed July 30, 1975, Ser. No. 600,351
Int. Cl.² A01G *27/00*
U.S. Cl. 47—80 **22 Claims**



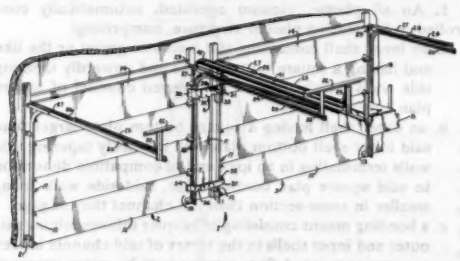
9. A soil irrigating system which comprises a substantially horizontal support, a silica sand sheet overlying said support which comprises a plastic sheet having adherent on a surface thereof a substantially continuous coating approximately one grain in thickness of silica sand particles essentially in the size range from about 0.002 mm to about 0.25 mm that are interspersed with a network of capillary spaces conducive to lateral spreading of water therealong, said silica sand sheet being disposed with said coating facing upwardly, a substantially opaque plastic sheet that is substantially impervious to moisture except for a multiplicity of substantially evenly spaced capillary openings therethrough about 0.045 to about 0.145 inch in diameter adapted for capillary travel of water therethrough and that directly overlies the silica sand coating on the silica sand sheet and means for supplying water to the interface between said silica sand sheet and said capillary sheet.

4,001,969

GARAGE DOOR STRUCTURE

Joseph J. Hoobery, 8908 W. 104th St. Drive, Overland Park, Kans. 66212

Filed July 6, 1976, Ser. No. 702,735
Int. Cl.² E05F *17/00*
U.S. Cl. 49—95 **7 Claims**



1. In a garage door structure having a pair of side-by-side door openings and a pair of doors movable between a closed position and an open position, each of said doors having a pair of guide tracks each positioned adjacent respective opposite sides of the respective door opening, each of said doors being counterbalanced and having means thereon guided in said respective guide tracks for movement of said doors between a closed position and an open position, the garage door structure having means for moving said pair of doors together as a unit between the closed position and the open position and comprising:

a. an upper tie member extending between and having opposite end portions thereof connected to a pair of doors adjacent an upper portion of said doors;

b. a lower tie member extending between and having opposite end portions thereof connected to said pair of doors adjacent a lower portion of said doors; and

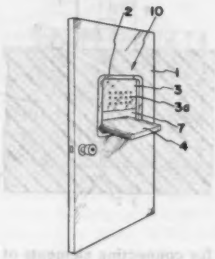
c. a remote controlled power means operatively connected to said upper tie member for selectively and simultaneously moving said pair of doors together as a unit between the closed position and the open position.

4,001,970

CLOSABLE COUNTER DEVICE FOR VERTICAL WALL

Akio Miyamoto, 19-24, 2-chome, Nakaikegami, Octu, Tokyo, Japan

Filed Feb. 11, 1975, Ser. No. 549,037
Int. Cl.² E06B *7/28*
U.S. Cl. 49—171 **7 Claims**



1. A closable counter apparatus for fitting in an opening through a vertical surface, said apparatus comprising:

a frame fitted into said opening and attached to said vertical surface;

a transparent plate mounted in said frame and spaced from one edge thereof, whereby a window opening between the edge of said plate spaced from said frame is defined;

at least two horizontal pins spaced from each other on each of the lower inside vertical side surfaces of said frame; and

a counter plate within said frame having longitudinal grooves in said opposite sides thereof engaging said horizontal pins, said counter plate being pivotable vertically within said frame about said horizontal pins, whereby said window opening and said transparent plate are covered, and said counter plate being slidable horizontally along said pins within said longitudinal grooves when said counter plate is pivoted toward the horizontal about said pins, whereby said transparent plate is uncovered, said window opening is opened, and said counter plate provides a counter surface.

4,001,971

UNIT WINDOW REGULATOR ASSEMBLY

Michael Gobush, Northville, and Richard Freedland, Southfield, both of Mich., assignors to Freedland Industries Corporation, Dearborn, Mich.

Filed Sept. 2, 1975, Ser. No. 609,621
Int. Cl.² E05F *11/48*
U.S. Cl. 49—352 **4 Claims**

1. For use in conjunction with a vehicle door or body having a framework and an upright opening defined by inner and outer walls;

a unit window regulator assembly nested within said opening comprising a pair of longitudinally spaced transverse support brackets secured to said framework;

an upright upwardly opening C frame in said opening spanning and supported upon and adjustably secured to said brackets for longitudinal and transverse adjustments thereon;

a pair of horizontally disposed longitudinally spaced elevator channels;

an upright window spanning, supported upon and secured to said channels;

a pair of parallel spaced arcuate guide rods at their lower

ends secured to said brackets and at their upper ends secured to said outer wall;

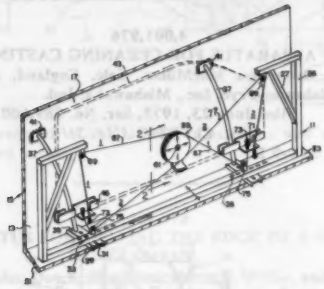
first lateral apertured flanges on one side of said channels receiving and guidably mounted on said rods for predetermined vertical and longitudinal translation movements;

second lateral flanges upon the other side of said channels;

a rotatable capstan journalled on said inner wall within said opening;

longitudinally spaced coplaner upper and lower pulleys on upper and lower portions of said C frame;

a first cable at one end connected to the second lateral



flange of one channel, extending through an upper pulley and a longitudinally spaced lower pulley, wound in one direction around said capstan, and at its other end secured to the second lateral flange of the other channel;

and a second cable at one end connected to the second lateral flange of said other channel, extending through an upper pulley and a longitudinally spaced lower pulley, wound in the opposite direction around said capstan, and at its other end secured to the second lateral flange of said one channel, whereby rotation of the capstan in one direction elevates and longitudinally translates the window for movement along said guide rods, and in the other direction, lowers said window.

4,001,972

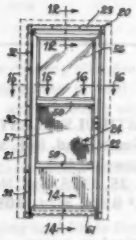
PREFABRICATED PRE-HUNG COMBINATION STORM AND SCREEN DOOR AND METHOD FOR INSTALLING THE SAME

Mathew Hurwitz, 63 Oakland Ave., Auburndale, Mass. 02166

Filed June 9, 1975, Ser. No. 584,779

Int. Cl.² E06B *3/32*

U.S. Cl. 49—380 **3 Claims**



1. In a pre-hung combination storm and screen door and jamb assembly, a combination comprising a pair of vertical jambs of extruded metal arranged to be mounted in a framed door opening in a building wall, a pre-hung assembly consisting of a door unsymmetrical with respect to its horizontal axis and including a hinge stile and a lock stile with horizontal rail members bridging said stiles adjacent to the upper and lower ends thereof, hinge means permanently connecting said hinge stile to one of said jambs so as to allow the door to open in one direction in relation to one side of said framed opening, said jambs having attachment provisions for the selective attachment of each of said jambs to either side of said framed opening, whereby inversion of said jambs and said door in the plane of the door will locate said hinge means on the opposite side of said framed opening to allow the door to open in an opposite direction, a readily mountable and detachable header member for connection to one end of said jambs and adapted for selective connection to the opposite end of said jambs upon the intended inversion of said jambs and door within the framed door opening, a plurality of movable panels within the door frame adapted to be affixed to said stiles between said horizontal rail members, said panels comprising a kickplate adjacent to said lower rail member, and at least one transverse mullion and panel thereabove extending between said stiles and said upper rail member, means for mounting said kickplate adjacent to said lower rail member or alternatively adjacent to said upper rail member preparatory to the transference of said header member to the opposite end of said jambs, means for fastening said transverse mullion and panel in the door opening beyond said kickplate, and an upwardly facing channel extender mounted between said stiles on said rail member adjacent to said kickplate at the lower portion of the door in both alternate positions thereof.

4,001,973

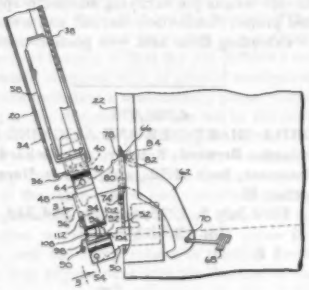
REMOVABLE DOOR HINGE SYSTEM

Frank L. Rice, Jeffersontown, and Arthur C. Wilson, Louisville, both of Ky., assignors to General Electric Company, Louisville, Ky.

Filed Oct. 6, 1975, Ser. No. 619,669

Int. Cl.² E05F *1/10*

U.S. Cl. 49—386 **4 Claims**



1. An appliance comprising an outer cabinet with a front-opening access door, the cabinet having a front frame forming a door opening, a pair of hinge mechanisms mounted on the door frame, the door being removably mounted upon the hinge mechanisms and capable of movement between a vertical closed position and a generally horizontal open position, each hinge mechanism comprising a fixed support bracket, a door guide pivotally supported from the support bracket, a hinge lever connected to the door guide, and slot means in the door frame through which the support bracket and hinge lever extend, a mating member mounted in the door for receiving the said door guide, and slot means in the door for reception of the door guide and hinge lever, and counterbalance spring means fixed at one end to the cabinet and attached at the other end to the hinge lever; the invention comprising a slip-on, self-supporting spring means encircling the door guide, said spring means having a fixed portion at one end, an intermediate locking portion of loop configuration, and a trigger portion at its opposite end that normally extends outwardly of the door guide for engagement by the mating member, the

support bracket including a keeper for receiving the locking portion of the spring means when the oven door is in a partially open position and the door is partially removed from the hinge mechanisms so as to disengage the mating member from the trigger, while the return of the door to the hinge mechanisms actuates the trigger to disconnect the locking portion from the keeper.

4,001,974

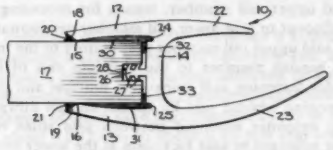
DOOR EDGE GASKET AND ASSEMBLY

John T. Wright, Cattaraugus, N.Y., assignor to Champion International Corporation, Stamford, Conn.

Filed Nov. 10, 1975, Ser. No. 630,297

Int. Cl.² E06B *7/22*

U.S. Cl. 49—488 **7 Claims**



1. A resilient gasket for application to the edge of a door, said gasket being formed of elastomeric material and having a channel for receiving the edge of the door, said channel being defined by opposite spaced apart lip portions extending from opposite side edges of an integrally interconnecting web portion, said lip portions, prior to assembly of said gasket to said door edge, converging outwardly from said web portion, each said lip portion engaging said door along an intermediate point thereof, the distal end of each said lip portion defining a fillet extending outwardly from said intermediate point thereof so as to be spaced from said door, thereby enabling adhesive to be trapped between the fillets of said lip portions and said door to provide means for verifying adequate application of adhesive and proper distribution thereof; and a seal establishing portion extending from said web portion outside of said channel.

4,001,975

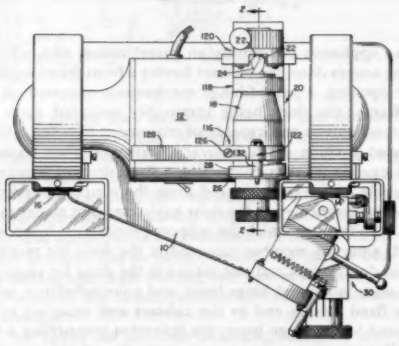
TWIST DRILL SHARPENER AND ALIGNING FIXTURE

Arthur Alexander Bernard, Beecher, and Richard Allen Bernard, Flossmoor, both of Ill., assignors to Darex Corporation, Beecher, Ill.

Filed July 9, 1975, Ser. No. 594,349

Int. Cl.² B24B *3/30*

U.S. Cl. 51—5 R **17 Claims**



12. A twist drill sharpener including a rotary grinding wheel, a twist drill chuck, and grinding control cams: characterized in that the cams are rotatably mounted on the chuck and the chuck includes means for locking the cams against rotation relative to said chuck, and means for aligning the lips of a twist drill to be sharpened with the chuck carried cams, said aligning means including a fixture adapted to receive the chuck and said fixture including means engaging the grinding control cams and further including a pair of opposed blocks, means mounting each of said opposed blocks for sliding movement toward and away from each other and into engagement with the lips of the chuck supported twist drill and in a plane transverse to the longitudinal axis of the twist drill to be sharpened.

4,001,976

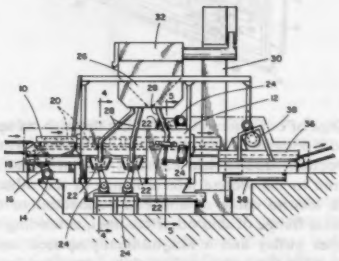
APPARATUS FOR CLEANING CASTING

William Robertson MacMillan, Sale, England, assignor to Wheelabrator-Frye, Inc., Mishawaka, Ind.

Filed June 23, 1975, Ser. No. 589,600

Int. Cl.² B24C *3/14, 3/18*

U.S. Cl. 51—9 R **5 Claims**



1. A device for removing mold sand from castings comprising:

a. an open framework vibratory conveyor receiving said castings and subjecting them to a jolting action to loosen and break up said sand;

b. a blast enclosure disposed about at least a portion of said conveyor; and

c. blasting means mounted to said enclosure for throwing particulate at said castings through said open framework to enhance and accelerate the breakup and removal of sand by said vibratory conveyor,

said open framework conveyor including a plurality of spaced bars which support and guide said casting, and wherein the configuration of said bars changes to alter the spatial orientation of the castings thereby to subject a greater portion of the castings to the blast means.

4,001,977

ROTARY VESTIBULE BLASTING DEVICE

Donald E. Schrader, South Bend, Ind., assignor to Wheelabrator-Frye, Inc., Mishawaka, Ind.

Filed Aug. 25, 1975, Ser. No. 607,261

Int. Cl.² B24C *3/14;* **B08B** *5/00*

U.S. Cl. 51—15 R **11 Claims**

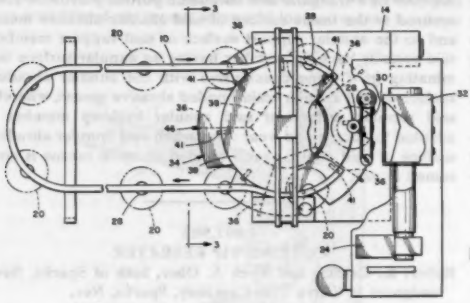
1. A device for particulate treatment of parts comprising:

a. a particulate treatment chamber having blast means therein and at least one opening thereto;

b. conveyor means for moving parts to be treated into and out of said chamber through said opening; and

c. a rotating vestibule for dynamically sealing each opening to said chamber to prevent particulate escape while permitting passage of parts into and out of said chamber on a continuous basis,

d. said conveyor having a drive mechanism and said vestibule including means for engaging said drive mechanism



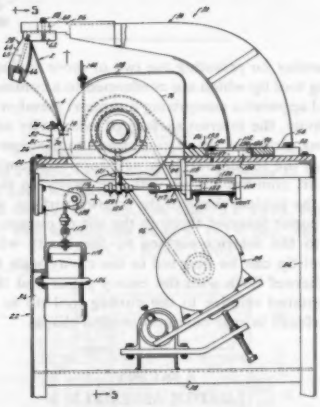
for movement of said conveyor to rotate said vestibule and vice versa.

4,001,978

APPARATUS FOR SHAPING THE EDGE OF A BLADE ELEMENT

Louis S. Hales; Don R. Hamilton; Harry F. Weller, and Donald E. Burgbacher, all of Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Apr. 1, 1975, Ser. No. 564,066
Int. Cl.² B24B *17/02, 19/14*
U.S. Cl. 51—100 R **8 Claims**



1. An apparatus for shaping to a predetermined profile an edge of a blade, translatable in said apparatus, said blade having a leading edge and a trailing edge, comprising:

motive means;

first means driven by said motive means for removing material from said blade, said first means having a first position wherein said first means engages a portion of one of said edges;

second means engaging said blade for supporting said blade during translation of said blade relative to said first means while successive portions of said one of said edges engage said first means in said first position;

third means engaging said blade for guiding said blade during said translation and for presenting said edge portion for engagement with said first means at a predetermined angle said third means including a cam surface having a predetermined configuration selected to represent the loci of a portion of said blade when successive portions of said one of said edges are presented for engagement with said first means at said predetermined angle, said cam surface being further configured to represent at least one of said loci which does not occupy the same point in space as other of said loci as successive portions of said blade are presented for engagement with said first means at said predetermined angle; and

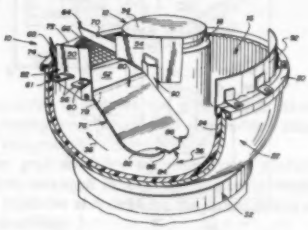
fourth means for holding said first means, said second means and said third means against translational movement with respect to each other during shaping of said edge.

4,001,979

UNLOADING RAMP ASSEMBLY

Raymon Kelsick Elkins, Arlington, and Richard Neil Hutson, Dallas, both of Tex., assignors to The Hutson Corporation, Arlington, Tex.

Filed Sept. 8, 1975, Ser. No. 611,129
Int. Cl.² B24B *31/06*
U.S. Cl. 51—163.2 **30 Claims**



20. An unloading ramp assembly comprising:

an elongate rod having a length substantially equal to the width of the hopper of a vibratory finishing machine;

means supporting the rod above the hopper of the vibratory finishing machine and extending substantially radially with respect thereto so that the rod defines a substantially horizontally disposed axis of pivotal movement;

ramp means including a substantially planar surface at least as long as the distance from the rod to the bottom of the hopper of the vibratory finishing machine;

means at the upper end of the ramp means for pivotally engaging the ramp means with the rod across the entire width of the ramp means and thereby initiating an insertion sequence in which the bottom end of the ramp means is engaged with moving media and piece parts in the hopper and the ramp means is thereby pivoted downwardly into engagement with the bottom of the hopper; and

handle means secured to one side of the ramp means for disengaging said one side of the ramp means from the rod.

4,001,980

GRINDING MACHINE

Sven-Herman Wallin, Djursholm, Sweden, assignor to Ambar Investment Inc., Herrliberg, Switzerland

Continuation-in-part of Ser. No. 307,370, Nov. 17, 1972, abandoned. This application Aug. 14, 1974, Ser. No. 497,384
Int. Cl.² B24B *49/12*
U.S. Cl. 51—165.72 **1 Claim**

1. A grinding machine for skin-grinding the surface of a metal workpiece, comprising:

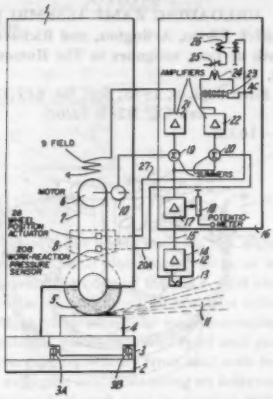
a machine frame and work-supporting means carried thereby,

a grinding wheel and frame-referenced feed means for movably positioning said wheel with respect to an exposed surface of a metal workpiece supported by said work-supporting means,

driving means for continuously rotating said grinding wheel,

traversing means for traversing said wheel and work-supporting means with respect to each other, whereby a flow of grinding matter will emanate in essentially a single direction of discharge away from the instantaneous zone of grinding contact with the workpiece in the course of a cutting traverse, said flow near the grinding region being characterized by radiant energy of magnitude indicative of the instantaneous depth of local grinding cut into the exposed surface of the workpiece,

radiant-energy responsive means positioned in offset adjacent to said flow and producing an electrical signal output proportional to the instantaneously detected radiant-energy level in said flow near the grinding region, and



control means responsively connected to said radiant-energy responsive means and operatively connected to said feed means for continuously positioning said grinding wheel with respect to the instantaneously ground workpiece region such that the radiant energy in said flow is maintained at a substantially constant level as evidenced by a substantially constant output signal produced by said radiant-energy responsive means in the course of a cutting traverse, whereby the exposed surface of the workpiece is skinned to an essentially constant predetermined depth of cut.

4,001,981

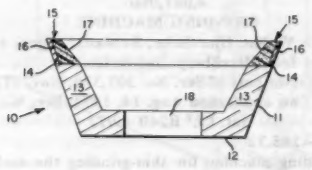
ABRASIVE ARTICLE

Everitt Franklin Wood, West Chester, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 443,205, Feb. 19, 1974, abandoned. This application June 26, 1975, Ser. No. 590,495

Int. Cl.² B24D *7/02*

U.S. Cl. 51—209 R **3 Claims**



1. An abrasive article comprising a nonabrasive support member having an annular support surface and an annular abrasive member adhesively secured directly to the annular support surface of said support member, wherein said annular abrasive member includes annular resin - bonded abrasive means so constructed and arranged as to provide the outer peripheral surface of said annular abrasive member and having an annular abrading surface, and an annular back-up member of a frangible and abradable porous polyimide resin secured to the inside surface of said annular abrasive means and to the annular support surface of said support member, said annular back-up member having an annular surface terminating in a plane coextensive with the annular abrading surface of said annular resin-bonded abrasive means, whereby said annular surface of said annular back-up member is adapted to abrade and wear away when said annular abrading surface of said annular resin-bonded abrasive means is consumed in use.

4,001,982

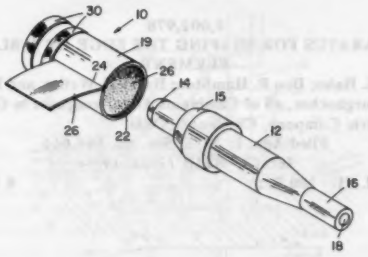
CUTTING TIP RESEATER

Robert K. Griffin, and Birch A. Ober, both of Sparks, Nev., assignors to Sierra Tool Company, Sparks, Nev.

Filed July 23, 1975, Ser. No. 598,464

Int. Cl.² B24D *15/00*

U.S. Cl. 51—211 R **5 Claims**



1. Apparatus for reseating the two or more sealing surfaces of a cutting tool tip which are conformed to a common conical shape, said apparatus comprising a support member having an interior cavity, the interior surface of said cavity at least partially having a conical shape conformed to the common conical shape of the sealing surfaces, said support member further having a slit communicating with the cavity so that the slit intersects the conical shape of the interior surface, and a sheet of emery paper inserted through the slit to circumscribe and conform to the interior surface to the cavity whereby the cutting tool tip can be inserted in the cavity with the sealing surfaces thereof flush with the emery paper and the support member rotated relative to the cutting tool tip to reseat the sealing surfaces in said common conical shape.

4,001,983

LOADER ASSEMBLY

Paul Favrot, Lyon, France, assignor to Landis-Gendron S.A., Villeurbanne, France

Filed Apr. 14, 1975, Ser. No. 560,757

Int. Cl.² B24B *47/22*

U.S. Cl. 51—215 R **5 Claims**

1. A loader assembly comprising

a channel member for gravitationally delivering unground workpieces to and removing finished workpieces from the grinding station of a machine tool such as a cylindrical grinder, said channel member including a magazine portion for holding a plurality of unground workpieces,

means for releasing workpieces from said magazine portion one at a time,

Pin means,

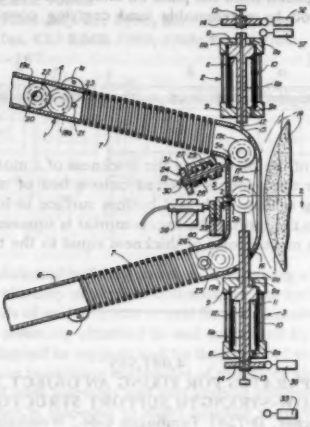
means for biasing said pin means to project into said channel for stopping the gravitational displacement of a workpiece after it has been released by said releasing means at a predetermined ready position,

locator means,

means for advancing said locator means from a retracted

position beyond said channel to an advanced position within said channel,

means for selectively pushing the stopped workpiece past said biased pin means after said locator means has been



displaced to said advanced position so that the workpiece will be gravitationally displaced to locate against said advanced locating means, and

means for selectively retracting said locator means from said advanced position to said retracted position.

4,001,984

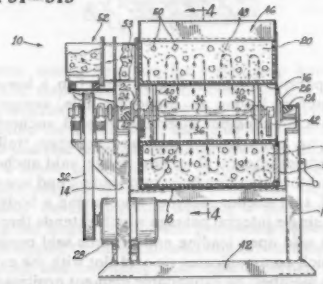
METHOD FOR FINISHING PARTS

Harvey Van Fossen, Mishawaka, Ind., assignor to Wheelabrator-Frye, Inc., Mishawaka, Ind.

Division of Ser. No. 418,556, Nov. 23, 1973, Pat. No. 3,918,212. This application June 6, 1975, Ser. No. 584,485

Int. Cl.² B24B *31/06*

U.S. Cl. 51—313 **3 Claims**



1. A method of surface finishing parts comprising the steps of: introducing parts and finishing media into an upper portion of a closed annular chamber defined by a pair of horizontally oriented concentric circular members of different radii; vibrating said chamber to produce orbital motion therein for causing said parts and media to move circumferentially within said chamber; discharging said parts and media from said chamber at said upper portion; and separating said parts from said media including the sub-steps of classifying the media according to a physical characteristic thereof, and returning selected portions of the media to said chamber at a bottom portion thereof by vibrational and gravitational force.

4,001,985

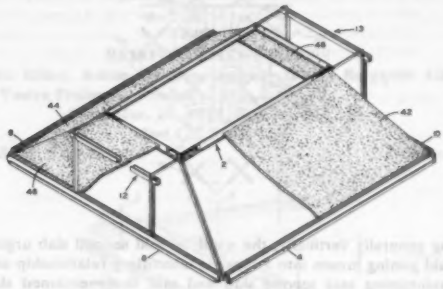
CEILING SUPPORT FRAME WITH PIVOTALLY ATTACHED OUTRIGGERS

Harold W. Nikolaus, Columbia, and Kenneth L. Wasson, Lancaster, both of Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Dec. 5, 1975, Ser. No. 637,899

Int. Cl.² E04B *5/62*

U.S. Cl. 52—28 **7 Claims**



1. A suspended ceiling for use with a room having a main structural ceiling from which said suspended ceiling is to be suspended comprising:

a. a main grid assembly consisting of a plurality of grid members arranged in a polygonal configuration forming plural modules and defining the lower plane of the suspended ceiling,

b. independent support means connected to and carried by the grid members in the lower ceiling plane and being capable of carrying the weight of an upper ceiling element and the load placed thereon,

c. a plurality of quadrilateral ceiling boards being carried by the grid members and the upper ceiling element,

d. the improvement comprises said upper ceiling element being at least one polygonal configured support frame formed of small frame members and positioned above the lower ceiling plane, said smaller frame defining the upper ceiling plane,

e. outrigger arm means being pivotally attached to said upper support frame and extending horizontally beyond the ends thereof to suspend said support frame from said independent support means and to position said upper support frame relative to a module formed by the grid members of the lower ceiling plane, and

f. a polygonal ceiling board being mounted within said upper support frame constituting the upper plane of the ceiling system.

4,001,986

ARCHITECTURAL CONSTRUCTIONAL SYSTEM

John Kozak, 323 Leax Lane, Turtle Creek, Pa. 15145

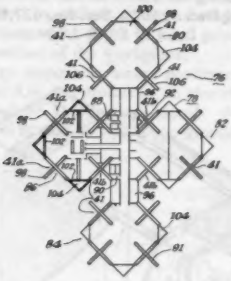
Filed June 10, 1974, Ser. No. 477,983

Int. Cl.² E04C *1/10;* **E04B** *1/34*

U.S. Cl. 52—73 **27 Claims**

1. A preformed structural member comprising a generally rectangular precast slab having sufficient thickness for load-carrying capability, joining means extending across said slab and spaced from opposed sides thereof, about one-half of said joining means being a narrowly tapered solid region and the remainder of said joining means being a complementarily tapered void region, said solid joining region being capable of interfitting tightly within a void region of a similar structural member, said void joining region being capable of receiving a solid joining region of said other member in tightly interfitting relationship whereby said structural member when thus interfitted is positively prevented from angular displacement rela-

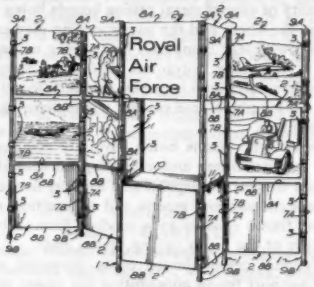
tive to said similar member, a second such slab, said second slab being inverted relative to said first-mentioned slab, and the tapered joining means of said second slab and of said first-mentioned slab being interfitted as aforesaid and extending generally vertically, the width of said second slab urging said joining means into a tapered interfitting relationship and maintaining said second slab and said first-mentioned slab rigidly in a predetermined attitude relative to one another to form a synergistic structural unit.



4,001,987
SCREEN CONSTRUCTIONS

James Albert Coulthard, Sheffield, England, assignor to Kepac, Limited, Sheffield, England

Filed Feb. 3, 1975, Ser. No. 546,452
Claims priority, application United Kingdom, Feb. 8, 1974, 5980/74
Int. Cl.² E04H 1/12
U.S. Cl. 52—79.9 **20 Claims**



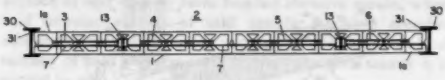
1. A screen construction comprising a plurality of support members of elongate form and uniform circular cross-section in contact with the floor, a plurality of rectangular panels, and a plurality of clips secured at at least two on each of two opposite edges of each panel, said clips snapping around the support members, each of said clips being open-ended and extending around greater than 180° of the circumference of said circular cross-section support member, adjacent ones of said panels thereby being orientatable at any angle relative to each other, and said support members being free-standing without any overhead support.

4,001,988
CONCRETE BLOCK PANEL

Monte Riefler, P.O. Box 210, Hamburg, N.Y. 14075

Filed Jan. 9, 1975, Ser. No. 539,774
Int. Cl.² E04G 21/00
U.S. Cl. 52—125 **13 Claims**

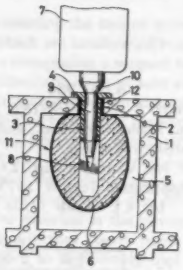
5. A prefabricated concrete wall panel which may be prefabricated and delivered to a constructon site in modular sizes, siad panel having planar top and bottom load bearing surfaces and laterally spaced top and bottom holes for lifting rods, a plate at the lower end of each rod in thrust relation to and extending below said bottom surface adjacent each rod and laterally spaced from the plate on another rod and connected to each rod by a releasable load carrying connection, the thickness of the plate being the thickness of a mortar joint so that when the panel is lowered onto a bed of mortar on a supporting surface with said bottom surface in load bearing relation to the mortar the excess mortar is squeezed out leaving only a mortar joint of thickness equal to the thickness of the plate.



4,001,989
APPARATUS FOR FIXING AN OBJECT TO A LOW-STRENGTH SUPPORT STRUCTURE

Artur Fischer, D-7241 Tumlingen Gde., Weinhalde 34, Waldachtal, Germany

Continuation-in-part of Ser. No. 617,832, Oct. 1, 1975, which is a continuation-in-part of Ser. No. 616,072, Sept. 23, 1975. This application Oct. 15, 1975, Ser. No. 622,681
Claims priority, application Germany, Oct. 30, 1974, 2451496
Int. Cl.² E04B 1/41; E04C 5/12
U.S. Cl. 52—127 **6 Claims**

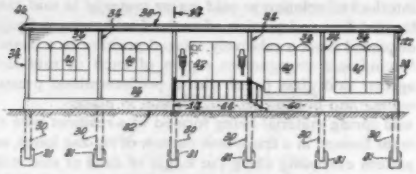


1. An apparatus for mounting an object to a low-strength support structure having an anchoring hole, comprising an elongated anchor member insertable in said anchoring hole and having an open leading end and an open trailing end provided with an integral abutment flange, said anchor member having a slot extending from said leading end towards said trailing end, said anchor member also having a body portion bounding a single integral passage which extends through said flange from said open leading end towards said open trailing end and which communicates via said slot with the exterior of said anchor member; an expandable element positioned about said anchor member so as to at least in part surround the same, said expandable element having a closed end bounding an interior space which encloses said open leading end of said anchor member and communicates via said slot with said internal passage; a plug surrounding said anchor member and filling said interior space, said plug being constituted of a hardenable substance injected by an injection device through said open trailing end into said internal passage and from there via said slot into said interior space, whereby a predetermined amount of said hardenable substance is admitted into said interior space and prevents withdrawal of said anchor member from said hole upon the hardening of said substance.

4,001,990
PREFABRICATED BUILDING STRUCTURE

William P. Chase, 8404 Willis Ave., Panorama City, Calif. 91402, and Leon Holloschutz, 8456 Blackburn Ave., Los Angeles, Calif. 90048

Filed July 23, 1975, Ser. No. 598,396
Int. Cl.² E04B 7/00, 1/98; E04H 9/00
U.S. Cl. 52—167 31 Claims

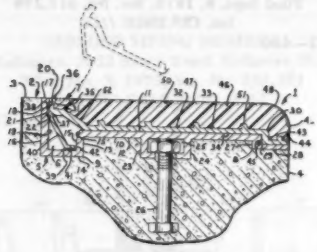


1. A prefabricated building structure comprising a floor slab assembly, a plurality of vertical columns, means for attaching the lower ends of said columns to said floor slab assembly, and a roof truss assembly attached to and supported by said columns and adapted to support and tie down a roof slab assembly, and means permitting movement of said floor slab assembly, said roof truss assembly and said vertical columns relative to one another in response to slight building movements due to shock, settling or the like.

4,001,991
STAIR NOSING STRUCTURE

Claude P. Balzer; Almer A. Reiff, and Edward M. Corman, all of Wichita, Kans., assignors to Balco, Inc., Wichita, Kans.

Filed Jan. 2, 1976, Ser. No. 646,359
Int. Cl.² E04F 11/16
U.S. Cl. 52—179 10 Claims



1. A stair nosing structure for a stair step having a tread surface, said stair nosing structure comprising:

a. an elongated relatively rigid base member adapted to be mounted on a stair step, said base member having forward and rear edge portions and upwardly facing portions and a lower face, said base member having an anchor portion adapted to be secured to the stair step, said base member having portions defining a channel extending along the length thereof and presenting opposed faces;

b. an elongated tread member having forward and rear edge portions and overlying said base member, said tread member having portions engaging upwardly facing portions of said base member;

c. elongated means on said tread member and extending therefrom and engaging said base member with an interference engagement with spaced portions of said base member including one of said opposed faces to secure said tread member to said base member;

d. said base member channel defining portions include wall members extending from said base member adjacent the rear edge portion thereof; and

e. said means to secure said tread member to said base member includes:

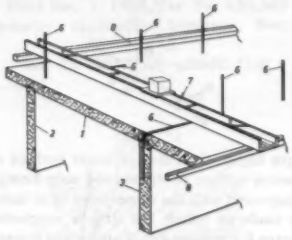
1. cooperating portions on the rear edge portion of said tread member and on one of said wall members of said base member for retaining the rear edge portion of said tread member in engagement with said one wall member of said base member; and

2. a resilient wall member extending from said tread member and in engagement with the other of said wall members on said base member for urging said tread member into clamping engagement with said upwardly facing portions of said base member.

4,001,992
REINFORCEMENT MEANS

Eric Röhss, Askim, Sweden, assignor to Ola Bergqvist AB, Vastra Frolunda, Sweden

Filed Mar. 20, 1975, Ser. No. 560,296
Int. Cl.² E04B 1/00
U.S. Cl. 52—251 4 Claims



1. An improved means for reinforcing concrete and to prevent collapse of concrete walls during the forming thereof comprising a complete cast wall having reinforcement means cast therein, and a joisting slab cast above and supported at least in part by said complete cast wall, said reinforcement means extending through said joisting slab and extending a sufficient distance thereabove to be cast into another wall supported at least in part upon said joisting slab, said reinforcement means comprising a steel wire, said wire having resilience on the portion thereof extending above said joisting slab, said resilience being of an order so that the portion of the wire may be readily deformed to a substantially level condition with the upper surface of said joisting slab during finishing operations thereupon and capable of springing back by its own resilience to its upstanding position for casting into the other wall.

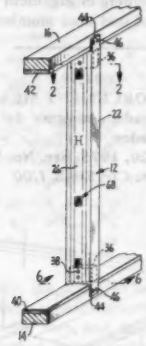
4,001,993
STEEL WALL STUD AND THE WALL FRAME EMPLOYING THE SAME

Lawrence H. Daniels, Piedmont, Calif., assignor to Kaiser Steel Corporation, Oakland, Calif.

Filed June 20, 1973, Ser. No. 371,764
Int. Cl.² E04C 2/24, 2/42
U.S. Cl. 52—376 9 Claims

1. A wall frame comprising a bottom wooden plate coextensive with the lower boundary of the frame, said bottom plate having opposite vertical faces and an upper horizontal surface extending between said vertical faces, a first strip of particle board coextensive with and overlying said upper horizontal surface, said first strip having an upper surface with a shear strength higher than that of the upper horizontal surface of the bottom plate, a plurality of studs extending upward from said bottom plate and first strip, each of said studs having a lower end bearing on said first strip and four sheet metal walls formed in a closed, generally rectangular, hollow cross-sectional shape with the lower edge of at least one of said walls disposed in bearing engagement with the upper horizontal surface of the first strip, said studs having a depth corresponding to the width of the bottom plate so that two opposing walls

of each of the studs lie in general coplanar relation to the respective opposite vertical faces of said bottom plate, each of said studs having an upper end opposite said lower end, a second strip of particle board supported on the upper ends of said studs, a top wooden plate overlying said second strip of particle board, said second strip having a lower surface with



shear strength higher than that of lower surface of the upper plate, said lower surface of the second strip being disposed in bearing engagement with the upper edge of at least one wall of each of the studs on which the strip is supported, and stud retaining means for retaining said upper and lower ends of said studs to said top and bottom plates.

4,001,994

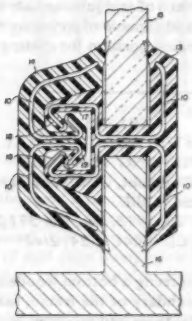
GLAZING DEVICE

Fred Williams, Pittsford, and Charles Yackiw, Fairport, both of N.Y., assignors to Schlegel Corporation, Rochester, N.Y.

Continuation of Ser. No. 502,073, Aug. 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 401,663, Sept. 28, 1973, abandoned. This application Nov. 10, 1975, Ser. No. 630,217

Int. Cl.² E06B *3/62*

U.S. Cl. 52—400 **4 Claims**



1. A glazing device for supporting a glass panel in place relative to an anchorage region around said glass panel, said glazing device including longitudinally extending inner and outer strips interlocked together and supported in place in said anchorage region to have a cantilevered free end portion of each of said strips extending farthest from said anchorage region and respectively engaging inner and outer peripheral surfaces of said glass panel, each of said strips comprising a length of spring material and an elastomeric material extruded over and encasing said spring material, and said glazing device comprising:

a. said spring material being in a fixed position in said anchorage region and extending to said cantilevered free end portion of each of said strips to a relatively movable position in the region of said engagement of each of said strips with said glass panel;

b. said spring material extending closely around the region of said interlock between said strips to provide gripping force for said interlock for firmly holding said strips in interlocked relation so said spring material in said cantilevered free end portion of each of said strips is flexibly displaced from a relatively relaxed position to a position forcing said engagement region of each of said strips against said glass panel with a predetermined pressure sealing and holding said glass panel in place;

c. said spring material being formed of a resilient wire element formed in a transverse pattern of zig-zag loops, said pattern extending along the length of each of said strips;

d. longitudinally extending rows of knitted strands linking said loops together in said zig-zag pattern; and

e. said predetermined pressure being a function of the tensile strength of said wire element, the diameter of said wire element, the material of said wire element, and the number of said loops per unit of length of said strip.

4,001,995

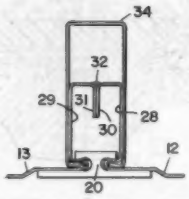
METAL ROOFING/SIDING SYSTEM

Donald Cotter, Pacifica, Calif., assignor to Field Form, Inc., Pacifica, Calif.

Filed Sept. 8, 1975, Ser. No. 611,298

Int. Cl.² E04C *1/34*

U.S. Cl. 52—460 **9 Claims**



1. A roofing and siding system comprising:

a plurality of elongate, generally planar sheets each having upwardly projecting flanges disposed along the lateral edges of said sheet, said flanges each having an outwardly directed C-shaped cross section, said sheets placed side-by-side so that the lateral edges thereof are contiguous to corresponding lateral edges of adjacent sheets to provide a generally weather-proof surface comprising the exposed surface of a building;

means for attaching the planar sheets to said building comprising a plurality of discrete clips disposed along each pair of contiguous lateral edges of said planar sheets, said clips being attached to the building and in engagement with the adjacent planar sheets to fix said sheets to the building; and

a plurality of elongate battens constructed of resilient material, each said batten having a generally rectangular cross section including two longer, substantially parallel sides and two relatively shorter sides, one said shorter side being slit so that the batten can be snapped over adjacent flanges on contiguous lateral edges of two said planar sheets and provide weatherproofing at said edges.

4,001,996

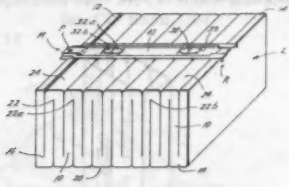
PREFABRICATED INSULATING BLOCKS FOR FURNACE LINING

Carlisle O. Byrd, Jr., Houston, Tex., assignor to J. T. Thorpe Company

Continuation-in-part of Ser. No. 475,439, June 3, 1974, Pat. No. 3,952,470. This application Aug. 11, 1975, Ser. No. 603,391

Int. Cl.² E04B 1/80; C04B 43/02

U.S. Cl. 52—509 26 Claims



1. An insulating block for lining a wall of a furnace and like equipment, comprising:

a. an insulating blanket folded into a plurality of folds of adjacent layers of fiber insulating material;

b. a portion of said fibers in said layers of said blanket adjacent said folds being transversely disposed to the remainder of said fibers and extending into other adjacent layers to bind the layers together into an insulating block; and

c. means for attaching said insulating blanket to the wall of the furnace, said means for attaching including a support member mounted in a fold of said insulating blanket.

4,001,997

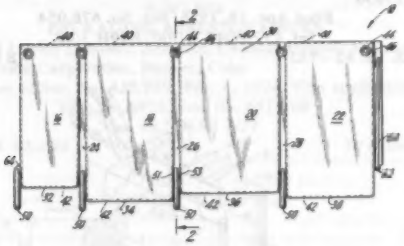
MOLDED SIDING MEMBER

Jerry E. Saltzman, 3022 Shore Road, Bellmore, N.Y. 11710

Filed Jan. 3, 1975, Ser. No. 538,391

Int. Cl.² E04D 3/362, 3/32

U.S. Cl. 52—521 7 Claims



1. A molded siding member for use on buildings composed of

a plurality of vertically extending panels connected side by side by intervening webs to simulate a horizontal course of shingles and having exterior and interior surfaces, the said webs being countersunk below the exterior surfaces to simulate spaces between adjacent shingles, each course being positionable with its lower margin overlapping the upper margin of the next lower course,

the member being formed along its upper margin with a plurality of nail receiving recesses molded into the exterior surface to form widely separated bosses protruding inwardly a predetermined distance from the interior surface of the siding member and its upper margin to engage the side of the building and thereby provide a predetermined spacing of the said upper margin outwardly from the side of the building when the member is nailed in place,

the member being formed with protruding portions extending downwardly below its lower margin and inwardly of the web surface to form locking tongues adapted to be inserted in the opening afforded by said predetermined spacing between the building and the upper margin of the next lower member to lock the lower margin of the upper member in place, the said tongues originating above the said lower margin and being separated therefrom to accommodate the said overlap.

4,001,998

PRE-FABRICATED STRUCTURAL ELEMENTS AND METHOD OF ASSEMBLING THE SAME

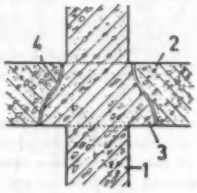
Wolfgang Naumann, Cologne, Germany, assignor to Horst W. Pollehn, Freidburg-Zaehringen, Germany

Filed Dec. 1, 1975, Ser. No. 636,365

Claims priority, application Germany, Dec. 12, 1974, 2458750

Int. Cl.² E04B 5/00; E04C 1/00

U.S. Cl. 52—608 11 Claims



1. A set of structural elements for assembling load-bearing structures, comprising

a first structural element;

at least one second structural element; and

respective cooperating abutment faces on said elements, said structural elements being adapted to be assembled relative to one another to form a load-bearing structure wherein said abutment faces extend substantially horizontally and bound with one another a gap which is horizontally elongated and which in vertical direction has a spatially curved cross-section the curvative of which extends at least in part orthogonally to the main stress lines acting upon the assembled structure in the region of said gap, so as to counter-act forces tending to move said elements apart in horizontal direction.

4,001,999

WOOD TRUSS STRUCTURE WITH ECCENTRIC END SUPPORT

Benson Chandler, P.O. Box 224, Medina, Wash. 98039

Continuation-in-part of Ser. No. 319,320, Dec. 29, 1972, abandoned, which is a division of Ser. No. 68,715, Sept. 1, 1970, Pat. No. 3,709,762. This application Oct. 10, 1975, Ser. No. 621,341

Int. Cl.² E04C 3/17, 3/42

U.S. Cl. 52—693 4 Claims

1. A structural component such as a truss or joist comprising multiple whole wood members, each with their grain arranged in the direction of its major dimension and as a group forming the outer periphery of said structural component

having a top chord and spaced diagonal and vertical inner members, gusset members positioned over selected joints of some of the multiple whole wood members being joined together and said gussets being joined to the whole wood members solely by an adhesive, said diagonal members being secured to said top chord adjacent to the outer ends of said top chord the ends of the top chord having downwardly facing support surface areas for engagement by vertical support structure, said structural component having eccentric moments induced therein by having said support surfaces off-set entirely inwardly from the intersection of the center lines of said top chord and diagonal members in a precise, predetermined manner at least to significantly reduce bending stress in said diagonal members and further to distribute and minimize bending moments throughout the structural component.

4,002,000

BEAM CONSTRUCTION AND METHOD OF MANUFACTURE

Robert W. Howard, Stouffville, and Desmond K. Rose, Mississauga, both of Canada, assignors to Palmer-Shile Company, Detroit, Mich.

Filed June 30, 1975, Ser. No. 591,868

Int. Cl.² E04C *3/30, 3/10*

U.S. Cl. 52—729 **2 Claims**

1. In a beam for use in industrial storage racks or the like, first and second beam sections, each section comprising a pair of spaced parallel flanges, said flanges being flat throughout their widths, a central web portion between and at right angles to said flanges and spaced therefrom a distance substantially greater than their thickness, and first and second inclined web portions connecting the edges of the central web portion to the edges of the flanges on the same side thereof, the outer surfaces of said second beam section flanges being spaced apart a distance substantially equal to the inner surfaces of said first beam section flanges, the outer surfaces of the flanges of said second beam section fitting snugly within the inner surfaces of the flanges on the first beam section, the flanges of said two beam sections overlapping substantially completely, whereby the sections together form a closed beam, and means securing said beam sections together comprising welds between the outer edges of the first beam section flanges and said second beam section.

4,002,001

WALL STUD FOR SECURING PLASTERBOARD

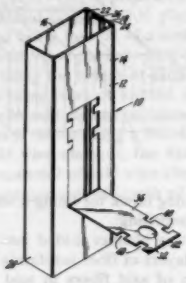
Samuel B. Uydess, 10 McKenna Place, Mamaroneck, N.Y. 10453

Filed Feb. 24, 1975, Ser. No. 552,549

Int. Cl.² E04C *3/30;* **E04B** *5/52*

U.S. Cl. 52—731 **2 Claims**

1. A wall stud for securing plasterboard to masonry, bricks, blocks and the like, said wall stud comprising box-like means for receiving fasteners which secure the plasterboard to said box-like means, said box-like means including first, second, third and fourth walls connected in sequence to define a box-like member, said first wall being adapted to be secured against the plasterboard in a parallel arrangement therewith, said box-like member being provided with anchoring means adapted to be disposed in mortar joints connecting the masonry, bricks, blocks and the like to secure said third wall against the masonry, bricks, blocks and the like, said anchoring means being movable to a position perpendicular to said third wall to extend away from said third wall, said anchoring means including a bent-out tab member having an attached portion connected to said third wall and an end portion which is remote from said third wall in the perpendicular position, open means for permitting insertion therethrough for forcing said remote end portion of said tab member out and away



from said third wall to said perpendicular position, said open means being disposed in said tab member between said attached portion and said remote end portion to receive mortar therethrough when in said perpendicular position to anchor said remote end portion when the mortar is hardened, said open means including a circular hole extending through said tab member and recesses provided in edge portions of said tab member, said recesses being disposed on opposite sides of said circular hole.

2. A wall stud according to claim 1, wherein said box-like member is fabricated from sheet metal and has a longitudinal overlap seam in one of said first, second and fourth walls.

4,002,002

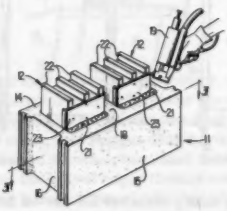
INSULATING BUILDING BLOCK

Jacob C. Barnhardt, Jr., Springs Road, Mount Airy, N.C. 27030

Filed Apr. 19, 1976, Ser. No. 678,054

Int. Cl.² E04G *21/00;* **B29H** *3/00*

U.S. Cl. 52—743 **8 Claims**



1. A method for forming a composite insulating building block which comprises:

a. disposing a shield insert within at least one original cavity of a hollow building block to form a relatively smaller cavity between the shield insert and a longitudinally extending side face of said original cavity, said shield insert extending from top to bottom of said original cavity when disposed in said original cavity;

b. dispensing a foam material into the smaller cavity between said shield insert and the side face of said original cavity;

c. allowing said foam material to solidify as it adheres to the side face of said original cavity, thus forming a layer thereon; and

d. removing said shield insert from said original cavity.

4,002,003

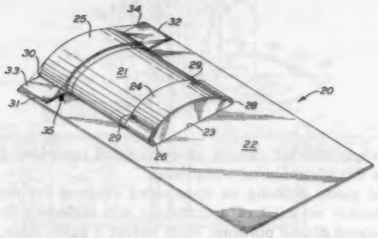
METHOD FOR SECURING ARTICLES TO A DISPLAY BOARD

Osmund V. Place, Hudson; Philip C. Hungerford, Jr., Cleveland Heights, and John L. Gereby, Wickliffe, all of Ohio, assignors to Cardpak Incorporated, Cleveland, Ohio

Division of Ser. No. 412,907, Nov. 5, 1973, Pat. No. 3,885,373. This application May 27, 1975, Ser. No. 581,023

Int. Cl.² B65B *1/04*

U.S. Cl. 53—14 6 Claims



1. A method for packaging articles with a display card generally larger than the article and having a cutout portion therein and at least one tab contiguous therewith, comprising the steps of:

placing the article and display card upon a movable belt;

urging at least one tab away from the plane of the display card by movement of the article relative to the display card whereby the article extends partially through the cutout portion and contacts the tab;

advancing the card and article to a position for the application of a means for joining the article to the card;

moving at least one of said joining means into juxtaposition with the article and card; and,

affixing the article to the card by applying said joining means to the article and at least one tab.

4,002,004

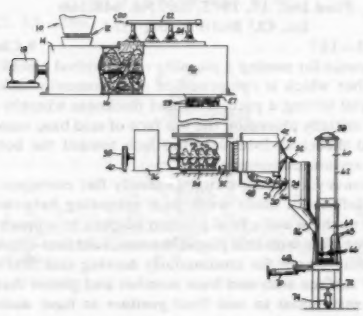
PACKAGING ASBESTOS FIBERS

Gerard Lucien Lambert, Asbestos, Canada, assignor to Johns-Manville Corporation, Denver, Colo.

Division of Ser. No. 438,969, Feb. 4, 1974. This application Feb. 26, 1976, Ser. No. 661,690

Int. Cl.² B65B *1/24*

U.S. Cl. 53—24 10 Claims



1. A method of packaging a mass of fluffy asbestos fibers comprising; (a) adding a small amount of liquid to said fluffy fibrous mass; (b) distributing said liquid throughout said fibrous mass; (c) partially compacting the resultant damp fibrous mass to increase the density thereof; (d) removing the excess air from the partially compacted fibrous mass; and (e) finally compacting said fibrous mass into a shape having a density of at least about 90 PCF.

4,002,005

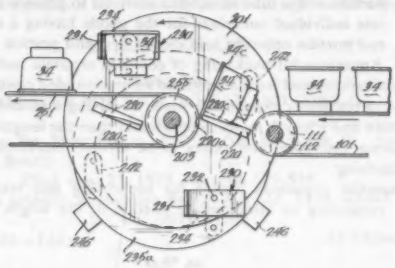
PACKAGE OF NESTED CONTAINERS AND METHOD AND APPARATUS FOR PRODUCING SAME

Martin Mueller, Wonder Lake, and David L. St. Clair, Wilmette, both of Ill., assignors to Owens-Illinois, Inc., Ohio

Continuation-in-part of Ser. No. 371,521, June 19, 1973, abandoned. This application Feb. 6, 1975, Ser. No. 547,647

Int. Cl.² B65B *35/58, 35/44, 53/02*

U.S. Cl. 53—26 15 Claims



1. A method of packaging nestable containers having different dimensions at opposite ends comprising the steps of: continuously feeding said containers in side by side relationship along transversely spaced adjacent process paths; engaging each container in each path and inverting alternate containers in each of said process paths while alternating said container inversion between said process paths such that inverted containers are in side by side relationship with noninverted containers; collating said containers into multiple row groups of predetermined number; moving a support member beneath each of said collated groups; transferring said groups in timed relationship with the moving of said support members to a second process path such that each group is positioned on a support member to form an assembly; enveloping each assembly in a film of thermoplastic heat-shrinkable material; and transferring said enveloped assemblies to a heating means whereby said film will be shrunk to the contour of said assembly to provide a finished package.

4,002,006

METHOD AND APPARATUS FOR PACKAGING GOODS

Edward C. Bruno, 4105 Holly St., Denver, Colo. 80216

Filed June 30, 1975, Ser. No. 591,420

Int. Cl.² B65B *9/14, 67/02*

U.S. Cl. 53—29 27 Claims

1. A method of packaging goods in separate individual containers formed from a length of a continuous unexpanded tube of expandable resilient net-like material having an open end and a length several times longer than the length of the individual containers to be formed therefrom, and comprising the steps of:

forming an open elongated cavity in only an intermediate portion of the continuous unexpanded tube of net-like material by resilient expansion of the intermediate portion, with the open end and portions of the continuous unexpanded tube of net-like material on opposite sides of the expanded intermediate portion being unexpanded, and providing an unexpanded end length portion between the expanded intermediate portion and the open end sufficient in length to form a container for the goods;

then closing the unexpanded open end of the continuous tube of net-like material to form a closed first end portion for the unexpanded end length portion;

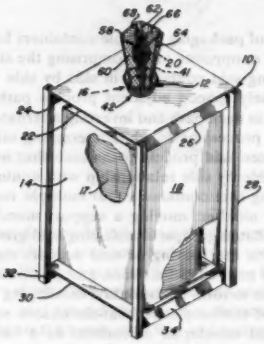
then placing the unexpanded end length portion and the closed first end portion thereof within the open elongated cavity and expanding a portion of the end length portion next adjacent the intermediate portion to provide an access opening to place the goods into the end length portion;

then placing the goods within the end length portion through the access opening and thereby resiliently expanding the end length portion between the access opening and the closed first end portion to form a container conforming to the goods with the goods and the end length portion being located within the expanded intermediate portion of the tube of net-like material during the forming of the container; and

then severing the end length portion from the intermediate portion of the tube of net-like material to provide a separate individual container for the goods having a second end portion opposite said closed first end portion.

5. Apparatus for packaging of goods in separate individual containers formed from a length of an unexpanded continuous tube of resiliently expandable material having a terminal end portion and a length many times greater than the length of the separate individual containers to be formed therefrom, and comprising:

material expansion means for supporting and resiliently expanding an intermediate portion of the length of the



net-like material adjacent the terminal end portion with the terminal end portion and portions of the continuous tube of net-like material on opposite sides of the expanded intermediate portion being unexpanded, and providing an unexpanded end length portion between the expanded intermediate portion and the terminal end portion sufficient in length to form a separate individual container for the goods;

elongated packaging chamber means defined by and located within said material expansion means for receiving the unexpanded end length portion of the net-like material, the terminal end portion being closed to prevent passage of goods therethrough; and

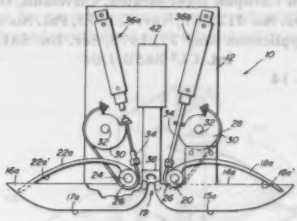
access opening means at one end of said packaging chamber means for permitting placement therethrough of the unexpanded end length portion of the net-like material into said packaging chamber means, and for enabling placement therethrough of goods into the unexpanded end length portion of the net-like material within said packaging chamber means to form an individual container for the goods by resilient expansion of the unexpanded end length portion to accomodate the goods, and for enabling removal of the goods and the individual containers formed for the goods upon severance of the end length portion from the intermediate portion of the net-like material.

4,002,007

APPARATUS FOR CLOSING FLEXIBLE CONTAINERS

Robert C. Bertelsen, 42044 Balmoral Drive, Columbiana, Ohio 44408

Filed Apr. 16, 1976, Ser. No. 677,768
Int. Cl.² B65B *51/08, 51/04, 13/02*
U.S. Cl. 53—138 A 7 Claims



1. Apparatus for closing an open-sided container formed from a flexible material comprising

fixed guide defining an open-sided channel for receiving flexible material of a container and including first and second planar portions, each having a guide edge,

first and second gathering arms supported for motion in planes parallel to, respectively, said first and second planar portions of said guide means, each gathering arm including a material contacting edge and being movable between a first open position in which said first and second arms are retracted from the associated guide edges and a second position in which said first and second arms overlap the associated guide edges and each other to enclose the open side of said channel defined by said guide means, thereby to gather portions of said flexible material intermediate said arms, each said material contacting edge shaped, such that it makes at least a right angle with its associated guide edge and also with the other material contacting edge throughout the movement of the arm between said first and second positions,

drive means for driving said arms between said portions, and

fastening means applying a closure device to said gathered material portions when said first and second arms are in their second positions.

4,002,008

COMPRESSION PACKAGING METHOD AND APPARATUS

John Louis Grasson, North Ridgeville, Ohio, assignor to Gould Inc., Rolling Meadows, Ill.

Filed Dec. 15, 1975, Ser. No. 640,560
Int. Cl.² B65B *63/02, 1/24*
U.S. Cl. 53—167 9 Claims

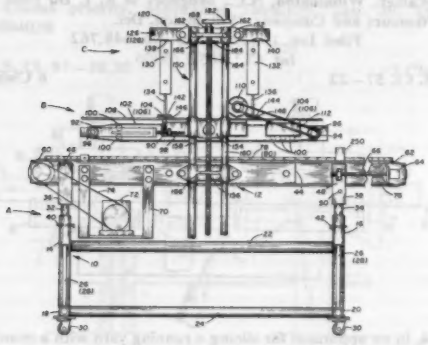
1. Apparatus for nesting a plurality of individual pieces in a base member which is comprised of a permanently deformable material having a predetermined thickness wherein said pieces are initially placed on the top face of said base member and forced thereinto from said top face toward the bottom face, said apparatus comprising:

a first conveyor having a first generally flat conveyor surface defining a lower work path extending between an initial position and a final position adapted to support said base member with said pieces thereon, said first conveyor including means for continuously moving said first conveyor surface with said base member and pieces thereon from said initial to said final position at least during a nesting operation;

a second conveyor having second generally flat conveyor surface defining an upper work path spaced generally vertically from and extending generally parallel to said lower work path between an initial and a final position,

said second conveyor including means for continuously moving said second conveyor surface from said initial to said final position at least during a nesting operation;

means for altering the transverse distance between said upper and lower work paths between a first normal position with said upper work path spaced from said lower work path a distance greater than the initial combined height of said base member with said pieces placed on the top face thereof and a second working position with the spacing between said paths being less than said initial combined height but greater than the height of said pieces such that said pieces will be engaged by said second



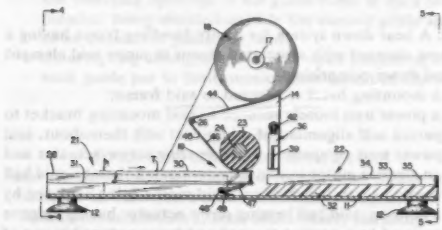
conveyor surface and forced into said base member from said top face toward said bottom face to create substantially permanent nesting areas for said pieces; and

means for selectively controlling operation of said altering means such that as said base member and pieces pass beneath said upper work path initial position said altering means moves said work paths from said first to said second position and as said base members and pieces are moved to said upper work path final position said work paths are moved from said second back to said first position, said base member and pieces being continuously moved between said work paths at least between said upper work path initial and final positions.

4,002,009
COMBINATION TAPE DISPENSER AND TRAY SEALER DEVICE

Felix P. Tolosa, and Lawrence Boxer, both of Alexandria, Va., assignors to Dynatech Laboratories, Incorporated, Alexandria, Va.

Filed Aug. 21, 1975, Ser. No. 606,454
Int. Cl.² B65B 7/16, 61/06
U.S. Cl. 53—296 **7 Claims**

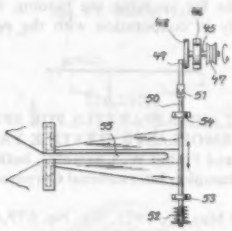


1. A device for applying a cover over the surface of a test tray having a multiplicity of upwardly open wells, comprising a base having a sealing zone intermediate a tray loading zone and a tray removal zone, means rotatably mounting a roll of tape in the upper part of said sealing zone, slide guide means on said loading zone leading to said sealing zone, feed means in said sealing zone for applying the leading end of said tape upon and along the top surface of said tray while moving said tray along said slide guide means to said removal zone comprising a rotatable feed roller disposed for pressing the leading end of said tape onto the top surface of said moving tray, and a tape guide pin or roller mounted on a fixed axis below said tape roll at the loading zone side of said sealing zone for tensioning the tape from said roll and directing the leading end of said tape at a predetermined angle to the underside of said feed roller while affixing the tape thereto, rotation of said roller serving to draw tape from said roll over said guide pin or roller and to slidably displace said tray through said sealing zone, and means movably mounted at said base for holding the leading end of the tape against said roller, said holding means being positioned so as to be engaged by the tray and moved to inoperative position when the tray passes through said sealing zone.

4,002,010
HARVESTER FOR RICE, WHEAT AND SIMILAR CEREALS

Domicano Da Silva Passos, 440 Durval Clemente St., Sao Paulo, Brazil

Filed Apr. 23, 1975, Ser. No. 570,586
Claims priority, application Brazil, Apr. 23, 1974, 03363
Int. Cl.² A01D 41/08
U.S. Cl. 56—126 **10 Claims**



1. A harvesting machine for a grain-carrying standing crop, said machine comprising:

a frame adapted to be displaced along the ground in a horizontal transport direction and formed with an upwardly and rearwardly inclined platform with a forwardly opening slot;

a pair of flailing elements on said frame to either side of said slot;

drive means on said frame for displacing said elements horizontally back and forth relative to said slot for threshing grain from crop projecting upwardly through said slot;

an upwardly and rearwardly extending collector conveyor on said frame including at least one belt on said frame below said slot for catching grain threshed from said crop; and

a cropper for said grain below said platform at the rear thereof for receiving grain from said conveyor.

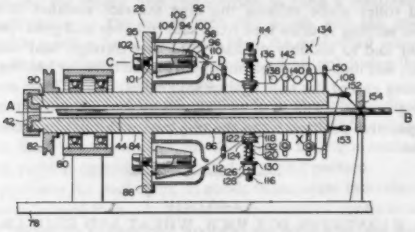
4,002,011
HIGH SPEED BINDING DEVICE

Shigenobu Tanaka, Higashi-Ooizumi; Seiichi Nishikawa, Chiba, and Seiji Ishikawa, Fujinomiya, all of Japan, assignors to The Fujikura Cable Works, Ltd., Tokyo, Japan

Filed Nov. 28, 1975, Ser. No. 636,202
Int. Cl.² D07B 3/04
U.S. Cl. 57—15 **10 Claims**

1. A high speed binding device comprising a flyer rotated about its rotation axis and having a through hole bored coaxially with said rotation axis for passing an element assembly therethrough, a cylinder of said flyer extending in the direc-

tion of said rotation axis, and a flange of said flyer formed at right angles to said cylinder, a plurality of package holders mounted on said flyer and each having a package having a wound binding thread and each having a package-attaching mechanism fixed to said flyer with a binding thread-winding axis of said package in parallel to said rotation axis of said flyer and suited for drawing out said binding thread in the direction of said winding axis, means provided on said cylinder for each said package holder, for imparting a substantially uniform back tension to each binding thread bound about said



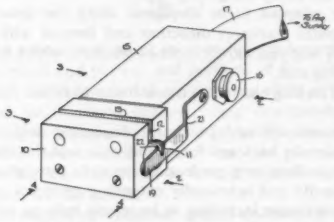
element assembly moving through said through hole bored through said cylinder, irrespective of the variation of the rotation speed of said flyer and including a first tensioner for imparting to each said binding thread a back tension which is decreased as the rotation speed of said flyer rises and a second tensioner for imparting to each said binding thread a back tension which is increased as the rotation speed of said flyer rises so as to cancel said decreased amount of back tension, and a binding die for applying the binding threads to said element assembly in cooperation with the rotation of said flyer.

4,002,012

METHOD AND APPARATUS FOR SPLICING THERMOPLASTIC TEXTILE YARN

Alan H. Norris, and Phillip W. Chambley, both of Rome, Ga., assignors to Champion International Corporation, Stamford, Conn.

Filed May 21, 1975, Ser. No. 579,442
Int. Cl.² D01H *15/00*
U.S. Cl. 57—22 **8 Claims**



1. The method of splicing thermoplastic yarn comprising the steps of placing in side-by-side overlapping relationship the yarn ends which are to be spliced, disposing the overlapping yarn ends within a cylindrical cavity of a splicing device with the yarn secured at opposite ends of said cavity substantially at the longitudinal axis thereof and with sufficient slack within said cavity to insure initially engagement of said yarn therein with the wall of said cavity when said yarn is spun circumferentially around said axis, and circumferentially spinning said yarn within said cavity for a time sufficient to cause, and thereby causing, thermal bonding of adjacent yarn fibers.

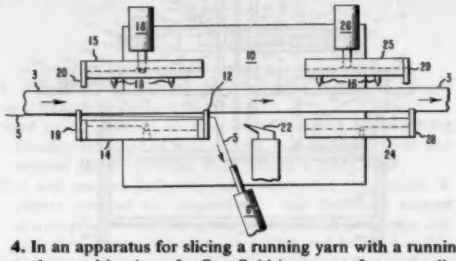
6. Apparatus for splicing thermoplastic yarn comprising a body with a cylindrical cavity therethrough, means for gripping overlapping yarn ends in side-by-side relation at opposite ends of said cavity substantially at the longitudinal axis thereof, said gripping means being arranged to introduce a predetermined amount of slack in the yarn therebetween and comprising at least at one end of said cavity a gripping element mounted for movement along the longitudinal axis of said cavity for a predetermined distance whereby the yarn ends can be stretched taut initially between said gripping means and said slack introduced by moving said movable gripping element, and means for circumferentially spinning said yarn in the span between said gripping means.

4,002,013

PROCESS AND APPARATUS

Melvin Harry Johnson, Wilmington, Del., and Calvin Brooks Walker, Wilmington, N.C., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 13, 1976, Ser. No. 648,762
Int. Cl.² B65H *69/06*
U.S. Cl. 57—22 **8 Claims**



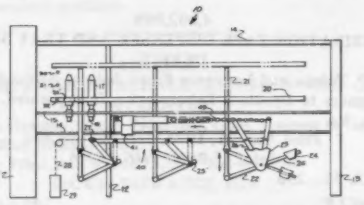
4. In an apparatus for slicing a running yarn with a running tow, the combination of a first fluid-jet means for entangling filaments of the tow with and about filaments of the yarn, cutting means for severing the yarn to leave a small protruding tail ahead of the entangled filaments, and a second fluid-jet means for entangling the tail within the tow.

4,002,014

BEAR DOWN SYSTEM FOR YARN HANDLING MACHINE

Charles A. Grant, Spartanburg, and Charles C. Saylors, Greenville, both of S.C., assignors to Grant's Textiles, Incorporated, Spartanburg, S.C.

Filed Dec. 23, 1974, Ser. No. 535,220
Int. Cl.² D01H *9/14*
U.S. Cl. 57—54 **18 Claims**



18. A bear down system for a yarn handling frame having a traverse element with associated means to move said element up and down comprising:

a. a mounting bracket secured to said frame;

b. a power unit loosely secured to said mounting bracket to permit self alignment of said power unit thereabout, said power unit comprising a ball bearing screw actuator and an electric motor operatively connected thereto, said ball bearing screw actuator and said motor being enclosed by a housing, said ball bearing screw actuator having a sleeve secured to a portion thereof and being extendible out of said housing;

c. a flexible, nonextensible connector secured to said sleeve at one end and to said traverse element movement means at an other end, whereby actuation of said power unit causes movement of said sleeve and said connector to effect movement of said traverse element; and

d. control means for said power unit, said control means actuating said power unit at a predetermined time and deactuating said power unit after said power unit has been actuated and has borne down the traverse element.

4,002,015

TWISTING MACHINE

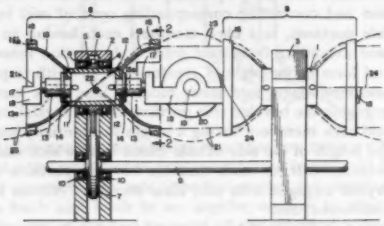
Dietrich Berges, Marienheide; Bodo Damzog, Remscheid, and Ulrich Saam, Gummersbach, all of Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Filed Jan. 20, 1975, Ser. No. 542,198

Claims priority, application Germany, Jan. 29, 1974, 2404030

Int. Cl.² D01H *7/90*

U.S. Cl. 57—58.38 **3 Claims**



1. In a twisting machine for stranding wires or the like including a plurality of rotatably mounted bearing members which are arranged in axial alignment on said machine and spaced at an interval one behind the other, a spool carrier for a take-off spool pivotally mounted for free oscillation and interposed between each of at least two successive bearing members, means to rotatably drive said bearing members at the same rotational speed and guide means to guide the wires in a transported path through each bearing member and outwardly around each individual spool carrier with its take-off spool, the improvement which comprises:

rotatable bearing members having guide bores for the transport of wires extending obliquely to the machine axis through each bearing member to emerge at openings adjacent the ends thereof facing the interposed spool carrier;

concave guide pots having oppositely disposed open projecting ends and being fixed at their bases to said facing ends of the bearing members for rotation therewith, each pot providing an outer curved guide surface which is approximately defined by said wire path when flying freely as the generatrix rotated symmetrically around the machine axis between two successive bearing members, the emerging openings of the guide bores in each bearing member being situated outside the curved guide surface of its associated guide pot; and

a retaining ring arranged around the open projecting end of each guide pot to limit outward movement of the wire.

4,002,016

OPEN END SPINNING APPARATUS

Peter Fischer; Bruno Schmidt; Rolf Langer, and Günter Trommer, all of Karl-Marx-Stadt, Germany, assignors to VEB Spinnereimaschinenbau, Karl-Marx-Stadt, Germany

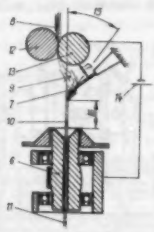
Filed Aug. 13, 1975, Ser. No. 604,398

Claims priority, application Germany, Aug. 16, 1974, 180546

Int. Cl.² D01H *1/12*

U.S. Cl. 57—58.95 **10 Claims**

1. In an open end spinning apparatus for converting staple fibers into yarn, the apparatus comprising a rotor having a rotatable surface to which a substantially parallel array of the fibers is fed substantially along the axis of the rotor and by engagement with which the fibers are twisted together, the improvement comprising a needle non-rotatably mounted adjacent the rotor and having a free end impinging on the path



of travel of the array of fibers to the rotor and being directed in the direction of the rotor, whereby the needle engages the array of fibers and thereby holds back the fibers at that point from co-rotating with the fibers engaged by the rotor.

4,002,017

FRICTION MEMBER FOR A MISTWISTING APPARATUS

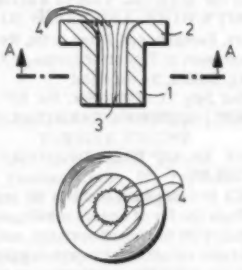
Ernst A. Weinz, Auf der Bilz 2, 6580 Idar-Oberstein 2, Germany

Filed June 23, 1975, Ser. No. 589,435

Claims priority, application Germany, June 28, 1974, 2431101

Int. Cl.² D02G *1/08*

U.S. Cl. 57—77.4 **7 Claims**



1. A friction element for use in a false twisting apparatus for the texturing of yarn, comprising a rotatable friction element in the form of an annulus having a curvilinear yarn-engaging surface, the surface having longitudinal grooves therein extending generally parallel to the axis of rotation of the friction member.

4,002,018

DEVICE FOR MODIFYING THE YARN WRAP ANGLE IN A FRICTION FALSE-TWIST DEVICE

Arnold Steck, Wattwil, Switzerland, assignor to Heberlein Maschinenfabrik AG, Wattwil, Switzerland

Filed Feb. 27, 1976, Ser. No. 662,288

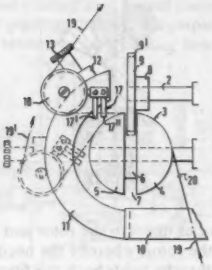
Claims priority, application Switzerland, Apr. 18, 1975, 4976/75; Dec. 3, 1975, 15711/75

Int. Cl.² D02G *1/08*

U.S. Cl. 57—77.4 **10 Claims**

1. A friction false-twist device for texturing textile yarns of thermoplastic synthetic material comprising a main friction element mounted to rotate about a first fixed axis and formed with an external surface constituted essentially by a convex surface of revolution about said first axis tapering inwardly towards said first axis from a central location of maximum diameter in each direction to terminal locations, said main friction element being formed with at least one circular groove having its centre on said axis and being substantially displaced from said terminal locations, a secondary friction element mounted to rotate about a second fixed axis parallel to said

first fixed axis and comprising as many circular discs as there are grooves in said main friction element, each such disc being centred on the second axis and arranged with a rim portion thereof projecting into an individual one of said grooves, a yarn-guide unit mounted externally of said main friction element, a support for said yarn-guide unit, and means for adjust-



ably positioning said yarn-guide unit on said support, said support and said positioning means constantly locating said yarn-guide unit substantially in a notional plane containing said first axis and arranged for said yarn-guide unit to be fixed in any position about substantially one half of said main friction element at the same distance from said surface of revolution for each such position.

4,002,019

METHOD OF MAKING YARNS FROM ANGORA RABBIT'S-WOOL AND YARNS SO MADE

Gerhard Egbers, Eningen, and Peter Artzt, Reutlingen, both of Germany, assignors to Patentverwertungs-AG der Spinnerei am Uznaberg, Ballen, Switzerland

Filed July 21, 1975, Ser. No. 597,454

Claims priority, application Switzerland, July 22, 1974, 10092/74

Int. Cl.² D02G *3/02, 3/04*

U.S. Cl. 57—140 BY **10 Claims**

10. Yarn of a fineness between Nm 60 and Nm 250 comprising fibres from the fur of angora rabbits, which fibres have been pretreated with a two-component composition of an antistatic agent and an agent for increasing the adhesability of the angora fibres, said fibres being spun together with an uninterrupted carrier thread of a cross-sectional area up to one third of the spun yarn.

4,002,020

FOUR-SIDED WATER-RESISTANT WATCH-CASE

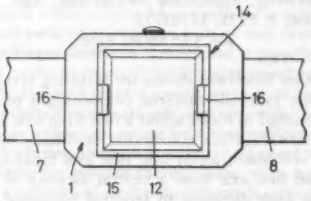
Hans Ulrich Klingenberg, St. Niklaus near Merzligen, Switzerland, assignor to Century Time Ltd., Switzerland

Filed Oct. 30, 1974, Ser. No. 519,293

Claims priority, application Switzerland, Nov. 9, 1973, 15758/73

Int. Cl.² G04B *37/08*

U.S. Cl. 58—90 R **3 Claims**



1. A four-sided water-resistant watch-case comprising:

a caseband having a plane upper surface and an opening therein for receiving a watch movement;

an annular gasket disposed on said plane upper surface adjacent said opening;

a crystal made of inorganic material covering said opening and resting on a top surface of said gasket, said crystal having outwardly beveled side portions extending from a top planar surface of the crystal part-way to a bottom coplanar surface of the crystal;

a bezel mounted to said caseband on said plane upper surface, said bezel comprising a frame having a main body portion surrounding said annular gasket and having an inner face, the plane of which is substantially perpendicular to said plane upper surface, contacting a complementary outer face of said gasket, said inner face extending upwardly from said plane upper surface toward but not higher than the bottom beveled edge of said crystal side portions, and at least one pair of oppositely disposed claw members extending upwardly from said main body portion and contacting corresponding ones of said beveled side portions, said claw members each having an inner face extending from said main body portion inner face and forming an angle of greater than 90° with respect to said inner face, said inner faces of said claw members engaging the beveled side portions of said crystal, each of said claw members having a length substantially less than the length of the side of said frame from which said claw member extends such that the beveled portions of the crystal engaged with said claw members remain largely uncovered; and

means securing said bezel to said caseband whereby said claw members press against said beveled side portions of said crystal to press said crystal against said gasket.

4,002,021

ROTARY ESCAPEMENT FOR TIMEPIECE

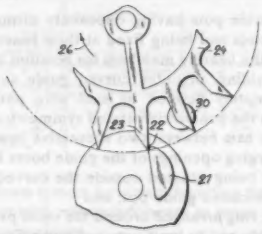
Roland Dubois, and Alexandre Antoine Bernasconi, both of Le Locle, Switzerland, assignors to Les Fabriques d'Assortiments Reunies, Le Locle, Switzerland

Filed Oct. 31, 1975, Ser. No. 627,909

Claims priority, application Switzerland, Nov. 2, 1974, 14651/74

Int. Cl.² G04B *15/14*

U.S. Cl. 58—117 **6 Claims**



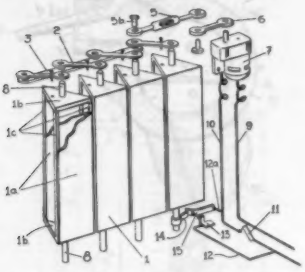
1. In a timepiece escapement wherein a balance carrying an eccentric pallet pin periodically and regularly oscillates forward and backward about a balance axis with the pin engaging on each forward oscillation between the teeth of an adjacent escape wheel rotatable about a parallel wheel axis to displace said wheel only during said forward oscillation about said balance axis through a predetermined lift angle centered on said balance axis, said pallet pin being engaged within the orbit defined by said teeth and substantially preventing rotation of said wheel independent of said balance during forward and backward oscillation of said balance through a predetermined engagement angle at least partially overlapping said lift angle, the improvement wherein said engagement angle is at least twice as great as said lift angle.

4,002,022

ELECTRO-MECHANICAL SIGN STRUCTURE WITH ALTERNATING FACES FORMED BY SEVERAL ADJACENT DIHEDRAL ANGLES

Guillermo Lopez C., 102 W. Crockett St., P.O. Box 2663, San Antonio, Tex. 78299

Filed Oct. 1, 1974, Ser. No. 511,055
Int. Cl.² G04B *19/00*; G09F *11/02*; G04B *19/02*
U.S. Cl. 58—126 R 8 Claims



1. An electromechanical sign structure comprising a frame, several adjacent dihedral angles contained inside said frame, means connected to said dihedral angles for rotating said angles back and forth in an angular motion to alternately exhibit each of the two faces of all the dihedral angles synchronously at the front of the frame, thus forming a continuous surface on which a sign or message has been placed, means in the frame supporting said rotating adjacent dihedral angles, said rotating means including a series of angle gears and pinion gears, a pinion gear being mounted on each of the dihedral angles, a rotary transmission shaft supporting the angle gears to transmit a rotational motion to said angle gears to thereby transmit a synchronized back and forth rotational movement to said dihedral angles to allow the sign formed by the adjacent faces to remain stationary for several seconds in the frame, means to stop the back and forth angular motion only when dihedral angles have completed their predetermined entire angular stroke, means to optionally illuminate the faces of said dihedral angles, said electromechanical sign structure further including a clock mechanism, means to support said clock mechanism, rearwardly of said dihedral angles, said mechanism having a clock hands shaft protruding through and between two dihedral angles disposed forwardly thereof to the front face of the frame, clock hands attached to the shaft forwardly of the front face means to exhibit the numerals of the clock face on the front of the sign.

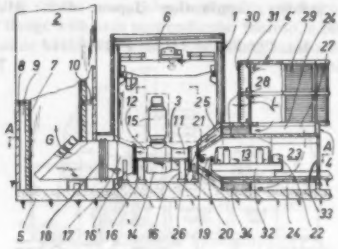
4,002,023

STATIONARY POWER-GENERATING PLANT

Max Hartmann, Baden, Switzerland, assignor to Brown Boveri-Sulzer Turbomaschinen Aktiengesellschaft, Zurich, Switzerland

Filed Mar. 25, 1975, Ser. No. 561,694
Claims priority, application Switzerland, Apr. 9, 1974, 4980/74
Int. Cl.² F02C *7/20*
U.S. Cl. 60—39.31 2 Claims

1. A stationary power-generating plant comprising a foundation, a building structure on said foundation and which houses a casing supported on said foundation, said casing enclosing an axial flow compressor shaft-connected to an axial flow gas turbine, a combustion chamber upstanding on said casing intermediate said compressor and turbine, an axial flow exhaust gas diffusor supported on said foundation and connected to said casing at the discharge side of said turbine, an upright exhaust gas stack connected to the discharge side of said diffusor, an electrical generator mounted on said foundation and shaft-connected to said compressor at the air inlet side thereof and which receives the principal useful power output from said turbine, said building structure including a pair of spaced walls extending longitudinally of and surrounding said generator and which establish therebetween an annular air intake duct for flow of air to said compressor, the lower part of said annular duct beneath the generator being incorporated within the foundation, said air intake duct being located



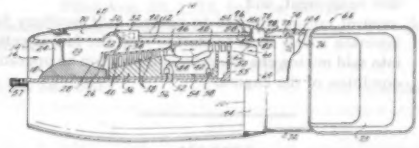
co-axially with the axis of said compressor and being connected to the inlet end of the latter by means of a convergent conical annular duct, and an air filter structure mounted above said building structure, the filtered air flowing downwardly from the filter outlet through an opening into said annular air intake duct and being turned into a horizontal flow through said duct into the compressor inlet.

4,002,024

INFRARED SUPPRESSION SYSTEM FOR A GAS TURBINE ENGINE

James Leroy Nye, Marblehead; Samuel Rothrock Barr, Swampscott; Thomas Chew, W. Peabody, and William Steyer, Ipswich, all of Mass., assignors to General Electric Company, Lynn, Mass.

Division of Ser. No. 528,797, Dec. 2, 1974, Pat. No. 3,921,906.
This application May 21, 1975, Ser. No. 579,549
Int. Cl.² F02K *1/02*, *3/02*
U.S. Cl. 60—262 9 Claims



1. An infrared suppression system for an aircraft gas turbine engine of the type having an integral inlet particle separator including a particle collection chamber and blower for evacuating said chamber, comprises:

means for directing the airflow from the integral inlet particle separator blower to the hot engine exhaust stream for mixing therewith,

means for capturing a portion of the ambient ram airflow around the engine and directing it to the hot engine exhaust stream for mixing therewith, and

wherein the engine is housed within an aircraft engine nacelle so as to define an annular bay area therebetween and cooling airflow is admitted to the bay area to cool the aircraft engine nacelle after which said bay cooling airflow is directed to the hot engine exhaust stream for mixing therewith.

4,002,025
SYSTEM FOR HEATING INTAKE PIPE OF INTERNAL COMBUSTION ENGINE

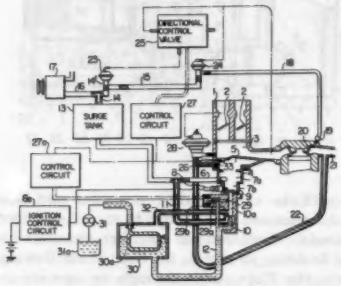
Shunzo Yamaguchi, Nishio; Tadashi Ozaki, Gamagori; Masashi Kida, Nishio, and Toshiaki Konomi, Susono, all of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, both of, Japan

Filed Oct. 29, 1975, Ser. No. 627,008

Claims priority, application Japan, Oct. 31, 1974, 49-126423

Int. Cl.² F02M *31/00*; F02B *75/10*

U.S. Cl. 60—274 **7 Claims**



1. In an internal combustion engine including an intake pipe and an exhaust manifold,

a system for heating the intake pipe comprising

a. a combustion equipment disposed adjacent to said intake pipe for heating the same and including a mixing chamber where the air and fuel are mixed, a combustion chamber which is communicated with said mixing chamber and in which the air-fuel mixture is burned, and an ignition means for igniting the air-fuel mixture;

b. a fuel supply system adapted to supply the fuel into said combustion equipment and including a main fuel injection nozzle and an auxiliary fuel injection nozzle so arranged as to inject the fuel into said mixing chamber of said combustion equipment;

c. an air supply system adapted to supply the air into said combustion equipment and including an air pump connected through air supply lines with said mixing chamber and said combustion chamber of said combustion equipment; and

d. control means adapted to control said auxiliary fuel injection nozzle so as to start or stop the fuel injection into said mixing chamber depending upon an operating condition of the engine.

4,002,026
DEVICE FOR THE AFTER-BURNING OF EXHAUST GASES

Dietmar Löffelhardt, Fellbach, Germany, assignor to J. Eberspacher, Germany

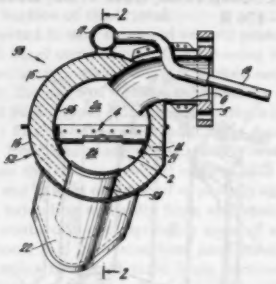
Filed Oct. 15, 1974, Ser. No. 514,466

Claims priority, application Germany, Oct. 17, 1973, 2351979

Int. Cl.² F01N *1/15*

U.S. Cl. 60—282 **10 Claims**

1. A device for the after-burning of combustible components of engine exhaust gases particularly for mounting on an engine block of an Otto cycle engine, comprising a cylindrical reactor housing closed at each end and having an interior elongated reaction chamber, a flat perforated bottom plate extending completely across said reaction chamber and dividing it into first and second reaction chamber portions, said plate being composed of at least two plate parts closing off said first reaction chamber portion from said second reaction chamber and with a marginal edge of one of said plate parts overlapping and slideably engaged on the other, a longitudinally extending support plate connected to each side of the interior of said housing and to each plate, a relatively short exhaust gas conduit having engine block mounting means at one end and connected at its opposite end into said first reaction chamber portion, a treated gas discharge conduit connected into said second reaction chamber portion, and secondary combustion air supply means connected through a portion of said exhaust gas conduit and communication with said first reaction chamber portion to supply air for reacting with the exhaust gases for flow through the perforations of said bottom plate to said reaction chamber portion and out said treated gas discharge conduit.



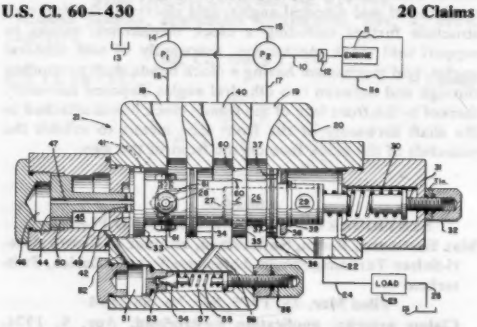
4,002,027
MULTIPLE PUMP CONTROL SYSTEM

James M. Eley, Corinth, Miss., and Fred T. Smith, Dearborn Heights, Mich., assignors to Tyrone Hydraulics, Inc., Corinth, Miss. and Sargent Industries, Inc., Los Angeles, Calif., part interest to each

Continuation of Ser. No. 402,292, Oct. 1, 1973, abandoned. This application Jan. 28, 1976, Ser. No. 652,532

Int. Cl.² F15B *13/09*

U.S. Cl. 60—430 **20 Claims**



1. In a fluid control system, a pair of fixed displacement pumps each having supply and discharge passages for supplying operating fluid from a reservoir to a load, control valve means including a movable valve member and valve passages for delivering the fluid discharged from the pumps to the load, said valve member being movable to a first position to combine the flow of fluid from said pumps for delivery to the load and to a second position in which the flow of fluid from a first one of said pumps is delivered to the load and in which flow from the other one of the pumps is by-passed from delivery to the load and valve actuating means operative in response to a predetermined upper limit of flow and to a predetermined upper limit of pressure downstream from one of the said pumps for moving the valve member to the second position

when either the predetermined upper limit of flow or the predetermined upper limit of pressure is reached.

4,002,028

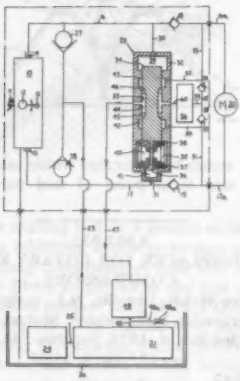
HYDROSTATIC TRANSMISSION MIXED LOOP SYSTEM

Tadeusz Budzich, 80 Murwood Drive, Moreland Hills, Ohio 44022

Continuation-in-part of Ser. No. 554,619, March 3, 1975, Pat. No. 3,962,872. This application Apr. 5, 1976, Ser. No. 674,036

Int. Cl.² F15B *15/18, 21/04*

U.S. Cl. 60—453 **10 Claims**



1. A fluid power transmission and control system having a variable delivery fluid pump and a fluid motor, fluid conducting means between said variable delivery fluid pump and said fluid motor, the improvement which comprises a fluid distributing and control system interposed between said variable delivery fluid pump and said fluid motor said distributing and control system having motor exhaust fluid bypass means to selectively bypass full flow of motor exhaust fluid past said fluid conducting means, said motor exhaust fluid bypass means including motor exhaust fluid diverting means, fluid reservoir means and motor exhaust flow boosting means and means for phasing full suction flow requirement of said variable delivery fluid pump from said motor exhaust flow boosting means to said variable delivery fluid pump.

4,002,029

PUMP MOTOR COMBINATION FOR HYDRAULIC TREATMENT

Francis L. Jones, Mentor, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Sept. 22, 1975, Ser. No. 615,442

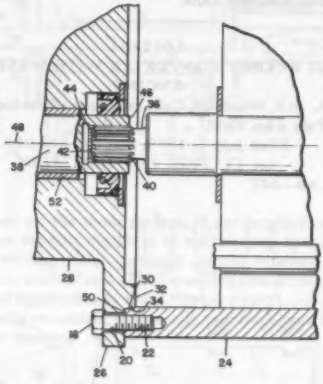
Int. Cl.² F15B *15/18*

U.S. Cl. 60—458 **3 Claims**

1. In a hydraulic implement controlling assembly comprising a hydraulic implement, a hydraulic pump for controlling flow of hydraulic fluid to said hydraulic implement and an electric motor for driving said pump, the improvement comprising:

means for coaxially aligning a driving shaft of said motor to the driven shaft of said pump, said aligning means comprising a first pilot on said motor and a second pilot on said pump mating with said pilot, said first pilot comprising a rounded undercut in a motor surrounding cylindrical casing proceeding from said motor towards said pump and said second pilot comprising an extension from said pump towards said motor, said extension fitting matingly within said undercut, said extension comprising a generally annular ridge having a rounded edge and extending towards said motor, said ridge being upraised from a flange which extends radially outwardly from said pump to abut an end of said cylindrical casing;

means for affixing said pump to said motor with said flange abutting an end of said cylindrical casing and serving along with said pump as an end cover for said motor, said affixing means comprising a plurality of holes through said flange with axes perpendicular thereto, a plurality of threaded bores extending longitudinally into said cylindrical casing, each of said bores being alignable with a respective hole in said flange and a plurality of bolt means affixed through said holes and threaded into said bores;



means for directly drivingly engaging said driving shaft with said driven shaft, said engaging means comprising a driving spline on said first end of said driving shaft and a mating driven spline on a first end of said driven shaft; and

only one single bearing supporting said driven shaft, said single bearing also serving to support the first end of said driving shaft via said engaging means.

4,002,030

PRESSURE FORCE GENERATOR FOR MACHINE TOOLS

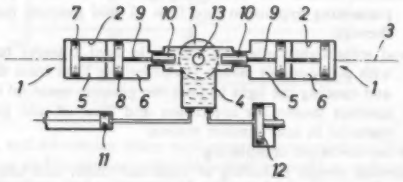
Siegfried Harcüba, Petersbergstrasse 51, 6600 Saarbrucken, Germany

Filed Aug. 20, 1975, Ser. No. 606,098

Claims priority, application Germany, Aug. 21, 1974, 2440163

Int. Cl.² F15B *7/00*

U.S. Cl. 60—581 **5 Claims**



1. A pressure force generator for machine tools comprising:

at least two, separate and independent, pneumatic-hydraulic pressure multipliers;

a single, high-pressure container directly connected to each of said multipliers and containing hydraulic fluid to be pressurized by said multipliers in order to actuate at least one of said machine tools;

each of said multipliers including two pneumatically-operated pistons mounted upon a single piston rod at one end thereof, and a plunger mounted upon said piston rod at the other end thereof and disposed within said hydraulic container for pressurizing said hydraulic fluid within said container; and

control means for selectively actuating said multipliers, either simultaneously, sequentially, or singly,

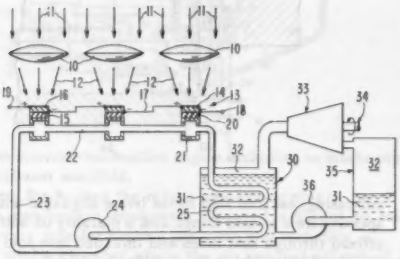
whereby the pressurization of said hydraulic fluid may be selectively controlled as desired or required so as to in turn selectively control the operation of said at least one of said machine tools.

4,002,031

SOLAR ENERGY CONVERTER WITH WASTE HEAT ENGINE

Ronald L. Bell, Woodside, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed July 7, 1975, Ser. No. 593,913
Int. Cl.² F03G *7/02*; **H01L** *31/06*
U.S. Cl. 60—641 **5 Claims**



1. A solar energy converter comprising:

collector means for concentrating solar electromagnetic radiation,

a gallium arsenide junction cell for receiving said concentrated radiation and converting a portion thereof to electrical energy,

means for transferring heat from said cell to a circulating fluid, and

heat engine means for converting a portion of said heat to mechanical energy.

4,002,032

SOLAR HEATED DEVICE

D'Arie G. Bash, 10345 SW. 117th St., Miami, Fla. 33176

Filed Nov. 28, 1975, Ser. No. 636,158
Int. Cl.² F03G *7/02*
U.S. Cl. 60—641 **14 Claims**

1. In a solar heated device for expansion of gaseous material including:

conduit means for containing gaseous material and for permitting expansion and flow of said gaseous material therein;

and solar light collecting means in heat transfer relation with said conduit means for collecting light from the sun and causing the light to heat the gaseous material in said conduit means for expansion and flow of said gaseous material in said conduit means;

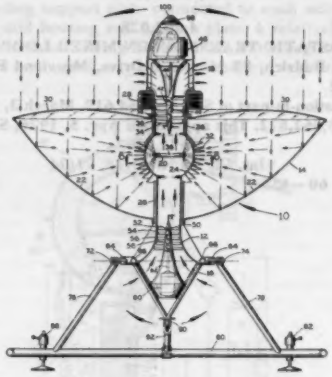
the improvement comprising

turbine means including at least one stator and one rotor driven by said expanded flowing gaseous material for converting solar energy into mechanical energy;

said solar light collecting means comprising a parabolic reflector means associated with said conduit means for directing light from the sun on to said conduit means to heat the same;

said conduit means being in heat transfer relation with gaseous material therein;

said parabolic reflector means having a focal point within said conduit means and encircling said conduit means; and



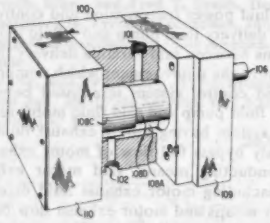
said turbine means being located within said conduit means adjacent said focal point of said parabolic reflector means.

4,002,033

ROTARY DISPLACER FOR ROTARY ENGINES OR COMPRESSORS

Robert Maurice Welch, Denville, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 4, 1975, Ser. No. 546,935
Int. Cl.² F01K *25/02*
U.S. Cl. 60—682 **15 Claims**



1. In a rotary engine of the rotary-abutment type having a housing with a plurality of cylindrical intercommunicating parallel bores therein and a piston centrally located in one of said bores, said piston having at least one rotatable lobe, the improvement comprising:

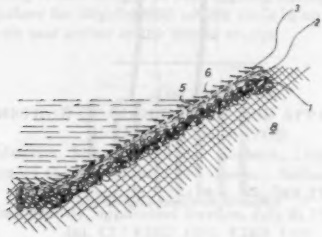
a cylindrical rotary abutment centrally located in another of said bores substantially engaging said piston and having at least one recess therein to engage said lobe during rotation, said rotary abutment having a first and a second section located along the axis thereof, said first section maintaining close clearance with the wall of said other bore and said second section having a diameter substantially smaller than said first section; and

means for defining discharge and intake ports in said housing for said rotary engine, said ports communicating with said other bore at different points along the axis thereof, one of said ports being located over said first section of said rotary abutment and the other of said ports being located over said second section of said rotary abutment so that said one of said ports located over said first section is sequentially opened and closed during the rotation of said abutment by said first section while said port located over said second section remains in constant communication with said other bore.

4,002,034
MATTING FOR THE PREVENTION OF HYDRAULIC EROSION

Walter Mühring, 20, Meppener Strasse, 45 Osnabruck, and Ernst-Gunther Gossling, 18, Bachstrasse, 495 Dankersen, both of Germany

Filed June 25, 1975, Ser. No. 590,169
Claims priority, application Germany, June 27, 1974, 2431038
Int. Cl.² C02B 3/12
U.S. Cl. 61—3 5 Claims



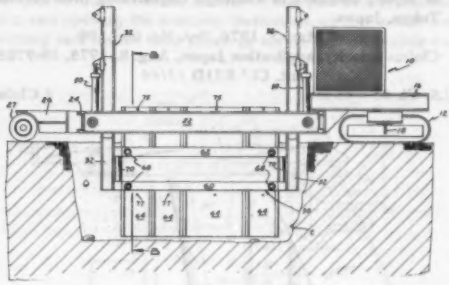
1. A protective matting laid on a ground surface adjacent a body of water for inhibiting hydraulic erosion of said ground surface, said matting comprising at least two superposed fibrous layers, the fibers employed in the one of said layers closest to said ground surface being thicker than those in the other of said two layers more remote from said ground surface, and the spacing between the thicker fibers in the one of said layers closest to said ground surface being greater than the spacing between the thinner fibers in the other of said layers more remote from said ground surface, and said matting including a third layer disposed outwardly of said two fibrous layers relative to the ground surface and constructed to provide a preferential direction of water flow through said matting with the resistance to water flow through said matting in a direction from the ground surface side of said matting toward the water surface side of said matting being less than the resistance to water flow through said matting in a direction from the water surface side of said matting toward said ground surface side of said matting wherein said third layer is positioned adjacent the uppermost surface of said matting facing said body of water and comprises a flexible layer having a plurality of perforations therein, said third layer further comprising means providing a plurality of flexible closure elements extending outwardly from said uppermost surface toward said body of water and adapted to selectively cover underlying associated ones of said perforations respectively in response to flow of water through said matting from said body of water toward said ground surface, and adapted to uncover said associated perforations respectively in response to flow of water through said matting from said ground surface toward said body of water.

4,002,035
MOBILE SHORING RIG FOR EXCAVATION OF TRENCHES

Charles V. Wright, 54 Oak Hollow Road, Springfield, Mass. 01128

Filed July 11, 1975, Ser. No. 595,366
Int. Cl.² E02D 19/00
U.S. Cl. 61—41 A 5 Claims

1. Mobile shoring for use in trench excavation comprising a carrier including a pair of laterally spaced longitudinally extending beams, beam support members, the opposite ends of each longitudinally extending beam being pivotably supported by one of said beam support members, conveyancing means including track vehicles, each beam support member being pivotably supported by one of said conveyancing means so that said conveyancing means may be swung outwardly and parallel to said longitudinally extending beams, a shoring frame supported by said carrier, said frame including longitudinally and transversely extending beam support members, means for raising and lowering said shoring frame relative to said carrier, a plurality of longitudinally and vertically spaced

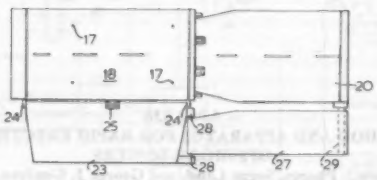


guide sections on the outer surface of the longitudinally extending beam support members of said shoring frame and a plurality of shoring plates vertically slidably retained by said guide sections, each of said plates spanning at least one of said vertically and longitudinally spaced pairs of guide sections and being vertically movable together with said frame and individually relative thereto.

4,002,036
MINE ROOF SUPPORTS

Ian Campbell Jeffrey, Parbold, and James Gray Stevenson, Wigan, both of England, assignors to Gullick Dobson Limited, Wigan, England

Filed May 9, 1975, Ser. No. 575,960
Claims priority, application United Kingdom, June 4, 1974, 24633/74
Int. Cl.² E21D 15/44
U.S. Cl. 61—45 D 9 Claims



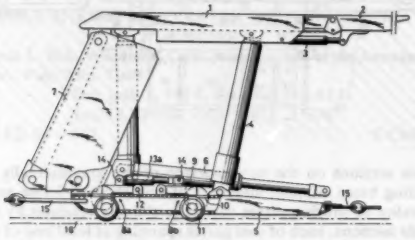
1. A self-advancing mine roof support comprising a base structure and a roof-engaging structure extending over said base structure and supported therefrom by hydraulically extensible props, said roof-engaging structure including selectively positionable lateral extension structure means for laterally extending the effective roof-supporting width of the roof-engaging structure in a direction transverse to its direction of advance, and ram means connected to said lateral extension structure means from the remainder of the support for applying force to said lateral extension structure means upwardly towards a mine roof to be supported thereby.

4,002,037

SELF-ADVANCING SUPPORT FOR USE IN THE PIT OF COAL OR METAL MINE

Masao Hujimori; Shigeo Nakajima; Ken Takahashi, all of Tokyo; Tsunetoshi Ito; Toshio Shimada, both of Yokohama; Hajime Endo, Kushiro, and Nobuo Kiyama, Yokohama, all of Japan, assignors to Taiiheiyo Engineering Incorporated, Tokyo, Japan

Filed Mar. 3, 1976, Ser. No. 663,190
Claims priority, application Japan, Aug. 8, 1975, 50-97057
Int. Cl.² E21D *15/44*
U.S. Cl. 61—45 D **4 Claims**



1. A self-advancing support for use in the pit of a coal or metal mine comprising a table, at least one beam mounted on the table for supporting the pit roof, poles supporting the beam on the table, a shifter for enabling the support to be moved in the pit, a plurality of wheel assemblies, each of said wheel assemblies comprising an arm, means pivotally connecting one end of each of said arms to the table, a respective wheel rotatably mounted on the other end of each of said arms, hydraulic cylinder-piston rod assemblies connected to said arms for pivoting said arms thereby alternatively to pivot said arms sufficiently downwardly for the wheels to support the table whereby the support may be transported with the aid of the wheels and to pivot said arms sufficiently upwardly for the table to rest directly on the floor of the pit whereby the wheels are not caused to bear a load when the support is in operation at a pit face, and openings in the table for receiving said wheels when the table is resting directly on the floor of the pit.

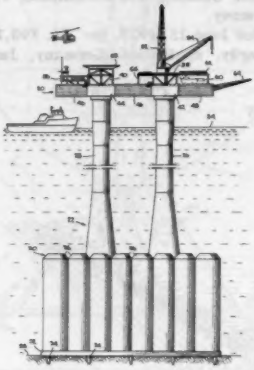
4,002,038

METHOD AND APPARATUS FOR RAPID ERECTION OF OFFSHORE TOWERS

Lindsey J. Phares, Sugar Land, and George J. Gendron, Houston, both of Tex., assignors to Raymond International Inc., Houston, Tex.

Filed Oct. 6, 1975, Ser. No. 620,203
Int. Cl.² E02B *17/00*
U.S. Cl. 61—91 **4 Claims**

1. A method of erecting an offshore tower, said method comprising the steps of positioning a template, having at least one vertical template leg, on a sea floor so that said vertical leg extends up above the sea level, said template being provided with jacking mechanism mounting means connected to the upper end of said template leg, moving a platform into position adjacent the template leg; connecting at least one jacking leg to extend down from an associated jacking mechanism on said mounting means and to be connected to said platform and



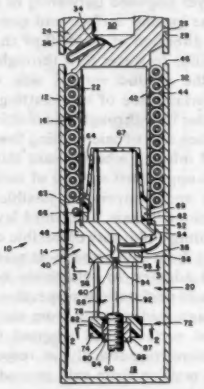
then operating said jacking mechanism to pull said jacking leg upwardly to raise said platform clear of the water.

4,002,039

SELF-REGULATING CRYOSTAT

Robert L. Cramer, and James A. Mientus, both of Davenport, Iowa, assignors to The Bendix Corporation, South Bend, Ind.

Filed Aug. 28, 1975, Ser. No. 608,421
Int. Cl.² F25B *19/00*
U.S. Cl. 62—224 **10 Claims**



1. A cryogenic cooling apparatus comprising:
a housing having a blind bore therein;
tubular means centrally located in said blind bore for establishing a temperature regulation chamber defined by the end thereof and the bottom of said blind bore;
nozzle means fixed to said tubular means in said temperature regulation chamber, said nozzle means having an orifice located therein;
finned tube means spirally wound around said tubular means, said tube means having an entrance port connected to a source of fluid under pressure and an exit port connected to said orifice;
support means located in said tubular means;
expander means having a first leg and a second leg fixed to said support means and extending into said temperature regulation chamber;

mounting means connecting said first leg with said second leg, said mounting means having an opening therein;

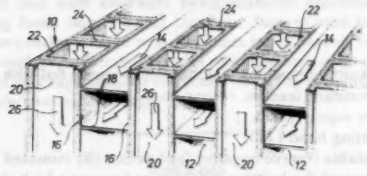
needle valve means connected to said mounting means and adapted to cooperate with said orifice in said nozzle means for controlling the flow of said fluid under pressure into said temperature regulation chamber in a manner to lower the temperature in the temperature regulation chamber, said first and second legs of the expander means expanding and contracting as a function of the temperature of the fluid in said temperature regulation chamber to proportionally regulate the flow of the fluid through said orifice; and

bushing means located in said opening having an eccentric surface for aligning said needle valve in an axial position with said orifice in the nozzle means.

4,002,040
METHOD OF COOLING AIR AND APPARATUS INTENDED THEREFOR

Carl Munters, Minusio, and Per Norback, Lidingo, Sweden, assignors to Aktiebolaget Carl Munters, Sollentuna, Sweden

Filed July 17, 1974, Ser. No. 489,236
Claims priority, application Sweden, July 8, 1973, 7310061
Int. Cl.² F28C *1/00;* **F28D** *5/00*
U.S. Cl. 62—121 **8 Claims**



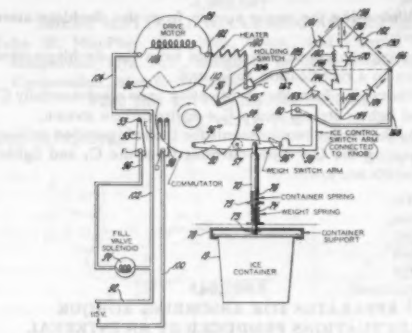
1. In a method of conditioning a first air stream by cooling by means of a second auxiliary air stream in a heat exchanger having two groups of channels separated from each other by walls through which heat exchange between the air streams occurs and having wettable material lining the channels through which the auxiliary air stream flows maintained wet by means of water which is caused to evaporate by the auxiliary air stream passing thereover to obtain cooling of the first stream with substantially unchanged moisture content thereof, the improvement providing increased conditioning efficiency comprising the step of applying water to the wettable material intermittently only for a period of time shorter than the period of time in which the evaporation takes place and in an amount in excess of that amount required for replacing the amount evaporated.

4,002,041
THERMOSTAT CONTROL SYSTEM FOR AN AUTOMATIC ICE MAKER

James Allen Canter, Englewood, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed June 18, 1975, Ser. No. 588,062
Int. Cl.² F25C *1/10*
U.S. Cl. 62—137 **3 Claims**

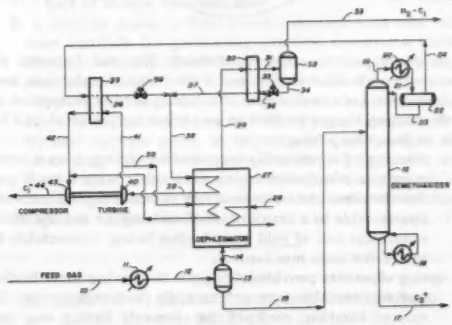
1. In an automatic ice maker for use within a freezer compartment including an ice tray, an electric drive motor including field windings, tray drive gear means operated by said motor for rotating said tray about its longitudinal axis so as to harvest ice pieces therefrom, a thermal ice harvesting control mechanism comprising: a mercury thermostat including a temperature sensing metal tube positioned within a longitudinal chamber in said tray with said tube principal axis coinciding with said tray rotational axis, said tube having an axial bore with a pool of liquid mercury at its closed inner end responsive to the temperature of the water change in the tray ice piece forming cavities, a pair of conducting wires extending into said bore at differing axial distances, means for hermetically sealing the front open end of said tube bore, such that upon the mercury pool sensing a below freezing temperature of the water charge in said tray cavities said mercury contracts axially toward the closed end of said bore causing disengagement of said mercury from the shorter of said pair of wire conductors and opening the mercury thermostat, circuit means connecting said motor field windings across the alternating-current output terminals of a full-wave diode bridge circuit, said wire conductors being connected between the direct-current terminals of said diode bridge, said diode bridge having an SCR switch connected in parallel with said wire conductors between said bridge direct-current terminals, whereby upon said mercury thermostat opening said SCR conducts to trigger each half cycle of said diode bridge circuit energizing said drive motor field winding causing rotation of said tray to harvest the ice pieces from said ice maker tray.



4,002,042
RECOVERY OF C_2+ HYDROCARBONS BY PLURAL STAGE RECTIFICATION AND FIRST STAGE DEPHLEGMATION

John A. Pryor, Emmaus, and Howard C. Rowles, Center Valley, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Nov. 27, 1974, Ser. No. 527,516
Int. Cl.² F25J *3/02*
U.S. Cl. 62—28 **19 Claims**



1. A method of separating and recovering a major portion of the C_2+ hydrocarbon content of a feed gas comprising hydrogen, methane, ethylene and ethane, which comprises:

a. introducing said feed gas into a dephlegmation zone comprising a plurality of indirect heat exchange passages through which at least a portion of the feed gas passes in an upward direction and is cooled by refrigerant means provided in indirect heat exchange with said passages, as said gas flows upward it partially condenses on the walls

of said passages forming a reflux liquid such that interaction takes place between the upward flowing gas stream and the stream of cooler liquid flowing downward and said liquid gradually becomes enriched with the C_2+ hydrocarbons of the feed gas;

b. cooling at least a portion of said feed gas in the dephlegmation zone by indirect heat exchange to form a condensate stream containing the major portion of the C_2+ hydrocarbons in the feed gas and a vapor stream containing the balance of the uncondensed material from the feed gas;

c. withdrawing the vapor stream from the dephlegmation zone;

d. passing the condensate stream from the dephlegmation zone to a rectification zone; and

e. withdrawing from the rectification zone a substantially C_1 and lighter stream and a C_2+ hydrocarbon stream,

whereby the energy requirements for the refrigeration utilized in separating the C_2+ hydrocarbons from the C_1 and lighter components are low.

4,002,043

APPARATUS FOR ABSORBING TORQUE FLUCTUATIONS PRODUCED BY AN INTERNAL COMBUSTION ENGINE

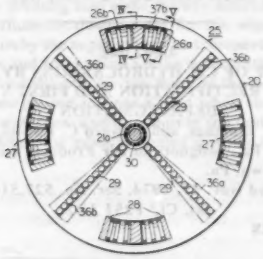
Akio Yoshida, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 416,370, Nov. 16, 1973, abandoned. This application May 7, 1975, Ser. No. 575,233

Claims priority, application Japan, July 10, 1973, 48-77035

Int. Cl.³ F16D *3/14*

U.S. Cl. 64—27 C **14 Claims**



1. An apparatus capable of being disposed between an internal combustion engine and a drive train mechanism, and adapted for use as a damped vibration system in absorption of a fluctuating torque present in an output torque produced by the engine, comprising:

a plurality of rotationally inert bodies arranged on a common axis of rotation facing each other with a small gap therebetween, an outermost one of said inert bodies being connectable to a crank-shaft of said engine and the other outermost one of said inert bodies being connectable to said drive train mechanism,

spring elements provided between the facing inert bodies and displaceable circumferentially with respect to the axis of rotation, each of the elements having one end thereof connected to one of said facing inert bodies and the other end thereof connected to another of said facing inert bodies, and

damping elements provided between said facing inert bodies, each of the damping elements having engagement with two adjacent bodies of said facing inert bodies, the values of the moment of inertia, spring constant, and damping coefficient of the system being preselected for averaging the torque output of the engine.

4,002,044

YARN STOP MOTION

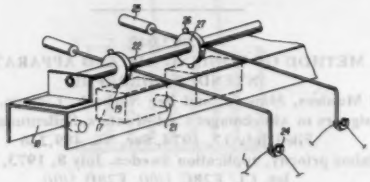
Michel Paul Dollat, Le Cheylard, France, assignor to Etablissements A. Chromarat & Cie, Paris, France

Filed Dec. 2, 1974, Ser. No. 528,859

Claims priority, application France, Dec. 18, 1973, 73.45399; Oct. 4, 1974, 74.33607

Int. Cl.³ D04B *35/12*

U.S. Cl. 66—161 **5 Claims**



1. A knitting machine which is continuously fed with a yarn under constant tension, comprising:

a yarn supply (2,3);

a knitting head (11);

a rotatable reserve negative feed device (8) mounted on the frame of the knitting machine and across which the yarn feeding the knitting head passes under substantially constant tension;

means for winding (13) up the knitted goods produced;

a first drive means including an electrical panel (15) for the stopping and operating movement of the knitting head and the winding means, said first drive means being connected to the winding means;

a yarn guide (7), located between the yarn supply and the feed device, over which the unwinding yarn passes;

a second drive means including an electrical panel (16) for the automatic starting and operating functions of the different movable elements of the knitting machine, said second drive means being connected to the means for rotating the feed device and to the first drive means;

means including a micro-contact (17) located in the vicinity of the guide, for transmitting to the second drive means the excess tensions of the yarn passing over the guide;

wherein said second drive means comprises:

a contactor (32) connected to the micro-contact and to the means for rotating the feed devices, for controlling the stopping and the operation of the movement of rotation of the feed device;

a first timing element (33) connected to the contactor and to the first drive means for, when the contactor is actuated, stopping the movement of rotation of the knitting head after a period of time at least equal to a predetermined short limit;

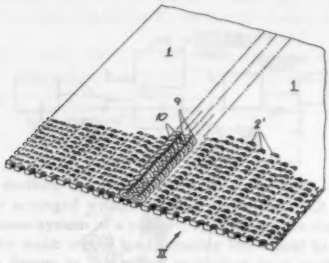
a second timing element (34) connected to the first timing element, for preventing the automatic restarting of the machine after a period of time at least equal to a predetermined upper limit,

a third timing element (36) connected to the first and second timing elements and to the first drive means for actuating rotation of the machine when the contactor returns to its initial position.

4,002,045
WARP-KNIT SUPPORT TAPE FOR SLIDE-FASTENER STRINGER

Alfons Fröhlich, and Marie-Luise Cappel, both of Essen, Germany, assignors to Opti-Holding AG, Glarus, Switzerland

Division of Ser. No. 511,676, Oct. 3, 1974, Pat. No. 3,965,833.
This application May 23, 1975, Ser. No. 580,306
Claims priority, application Germany, Oct. 6, 1973, 2350318
Int. Cl.² D04B 7/16, 11/12, 21/14, 21/16
U.S. Cl. 66—202 1 Claim

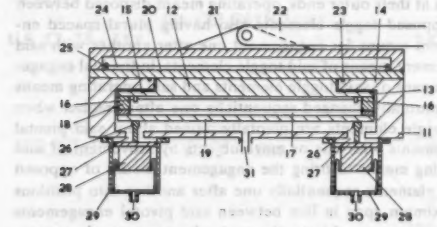


1. A slide-fastener stringer support tape comprising a plurality of warp-knitted warp filaments and weft filaments, a portion of said weft filaments being textured synthetic yarns forming loose bulges on at least one face of said tape and another portion of said weft filaments being shrunk synthetic yarns, said yarns forming a series of loop-free spaces along an edge of said tape adapted to receive stitching securing a coupling element to said edge.

4,002,046
TEXTILE PRINTING APPARATUS

Guillaume Ward Jamin, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Oct. 14, 1975, Ser. No. 622,157
Claims priority, application United Kingdom, Oct. 23, 1974, 45841/74; Oct. 23, 1974, 45842/74
Int. Cl.² B41C 1/06; B25B 11/00; B30B 15/34; D06P 5/20
U.S. Cl. 68—5 C 4 Claims

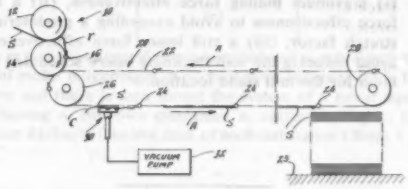


1. Apparatus for effecting the colouration of snythetic textile materials, at a reduced pressure, by a transfer process, which comprises a pair of opposed rigid platens mounted for relative movement towards and away from each other, means for heating at least one of said platens to a temperatre above 100° C, means for enclosing at least a portion of the space between the opposed surfaces of said platens when the platens have been moved towards each other into a closed position and means for reducing the pressure, within said portion, when the platens are in said closed position, to below 100 mm of mercury, at least one rolling diaphragm air cylinder assembly having a cylinder, a piston within the cylinder and a flexible rolling diaphragm sealed at its periphery to the inside of said cylinder, said diaphragm being connected to said piston and forming an annular fold or roll which resides between a portion of the piston and the sidewall of the cylinder, one of said platens being supported from the piston of said rolling diaphragm air cylinder assembly, the space on the side of said rolling diaphragm from which the platens is supported being connected to the gas tight region between the platens whereby relative motion between the platens is effected by the differential pressure that is established across said rolling diaphragm when the pressure in the gas tight region is reduced.

4,002,047
SHEET MATERIAL DECURLING APPARATUS

John M. MacPhee, Rowayton, Conn., and Charles Robert Gasparrini, Rye, N.Y., assignors to Baldwin-Gegenheimer Corporation, Stamford, Conn.

Filed July 7, 1975, Ser. No. 593,568
Int. Cl.² B21D 1/00
U.S. Cl. 72—160 11 Claims



1. A sheet material decurling apparatus for use with a machine having sheet material conveyor means, the sheet material having thickness *t;* said apparatus comprising:

A. a trough member including

1. two elongate sheet supporting members, each having an arcuate upper surface with a radius greater than 100*t*,
2. an elongate fillet joining said sheet supporting members having an arcuate upper surface, curved in the direction opposite to that of the sheet supporting member surfaces, with a radius of less than 15*t*, the angle formed between the planes tangent to said sheet supporting member surfaces at the lines of transition therefrom into the fillet surface being in the range of 60° to 120°, and
3. a plurality of vacuum conduits adjacent the bottom of said fillet, said conduits having a cross-sectional area of from 0.05 square inch to 0.15 square inch per linear foot of trough member, and

B. a vacuum pump in fluid communication with said vacuum conduits for generating gas flow downward therethrough, whereby sheet material drawn across said trough member, with a curl directed theretoward by the conveypr means, is pulled down onto said sheet supporting member surfaces and into said fillet by gas flow generated by said vacuum pump to impart a reverse bend to the sheet material and whereby said decurling apparatus can decurl sheet material having widths less than that which the trough member can accommodate without covering exposed vacuum conduits.

4,002,048
METHOD OF STRETCH REDUCING OF TUBULAR STOCK

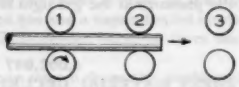
Dezsoe Albert Pozsgay, Pittsburgh, Pa., assignor to Aetna-Standard Engineering Company, Elwood City, Pa.

Filed Dec. 19, 1975, Ser. No. 642,663
Int. Cl.² B21B 17/00
U.S. Cl. 72—205 12 Claims

11. A process for the stretch reducing of the tail end of tubular stock of finite length, in a multiple stand rolling mill, in which at least a plurality of mill stands at the upstream end of the mill are of variable speed, which comprises

a. initially driving said variable speed mill stands at steady-state speed,

b. upon entry of the tail end section into the upstream mill stands, initially controlling the mill stand engaging the end section farthest upstream to provide maximum retarding force effectiveness, and



ROLL SPEED	84.5%	100%	100%
PULL FACTOR	−.976	+1.000	
STRETCH FACTOR	.144	.144	

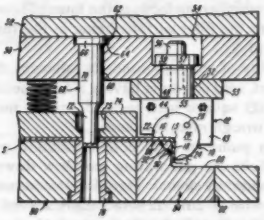
c. controlling one or more variable speed mill stands downstream of the last mentioned mill stand to provide one of (i) maximum pulling force effectiveness, (ii) a lesser force effectiveness to avoid exceeding a predetermined stretch factor, (iii) a still lesser force effectiveness to avoid reducing the wall thickness below scheduled minimum for the mill stand location.

4,002,049

FORMING TOOL FOR USE IN A DIE ASSEMBLY

Allan Emerson Randolph, Sr., Kettering, Ohio, assignor to Ready Stamping System, Inc., Dayton, Ohio

Filed June 9, 1975, Ser. No. 585,066
Int. Cl.² B21D *5/04*
U.S. Cl. 72—388 **9 Claims**



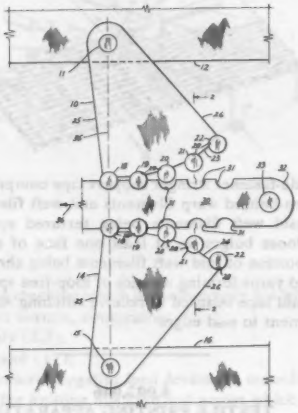
1. A forming tool comprising a holder an exterior surface portion of which includes a groove the base of which is arcuately configured and provides a bearing surface for an operating head in the form of a roller device, said roller device including a longitudinally extended radially directed V-shaped notch the side walls of which are outwardly divergent, define an angle which is less than that to be formed in the work material to which it is applied and provide circularly spaced edge portions at their outer extremities for contact with the work material, said roller device being mounted for free rotation with respect to said holder in response to a bearing of one of said spaced edge portions against a supported portion of the work material and a bearing movement of the other of said spaced edge portions on an unsupported portion of the work material whereby to bend a portion of said material to a predetermined angle, and means providing abutment surfaces which determine the limits of rotation of said roller device in the application thereof to work material.

4,002,050

FORCE MAINTAINING TOGGLES SYSTEMS

Edward Albert Clavin, Houston, Tex., assignor to Mid-Continent Pipeline Equipment Co., a division of Harrisburg, Inc., Houston, Tex.

Filed June 11, 1975, Ser. No. 585,976
Int. Cl.² B21D *9/00*; G05G *1/04*
U.S. Cl. 72—466 **28 Claims**



1. Toggle system, comprising plural opposed toggle elements having plural spaced engagement means at their inner ends and adapted for pivotal engagement with one or more objects at their outer ends, operating means disposed between said opposed toggle elements also having plural spaced engagement means for engagement one after another with said engagement means of said toggle elements, individual engagement means of said toggle elements and said operating means being mutually engaged sequentially one after another when said toggle elements are pivotally moved about said pivotal engagements with one or more objects by movement of said operating means to bring the engagement means of opposed toggle elements sequentially one after another into positions of maximum span in line between said pivotal engagements with one or more objects, the next subsequent toggle engagement means engaging in the next subsequent operating means engagement means at the time that one toggle engagement means already engaged in an operating means engagement means reaches a position aligned between said pivotal engagements of opposed toggle elements, the maximum span between said pivotal engagements with one or more objects increasing stepwise from a shorter span when the engagement means at one end of said pluralities thereof are engaged to a longer span when the engagement means at the other end of said pluralities thereof are engaged, whereby as the space between objects pivotally engaged by said toggle elements increases as said span increases in length the force on said objects is maintained at or near maximum as sequential of said engagements occur.

4,002,051

METHOD FOR DETERMINING THE BEHAVIOR OF A SHOCK ABSORBER OF A MOTOR VEHICLE ARRANGED IN THE WHEEL SUSPENSION AND A JIG FOR PERFORMING THE METHOD

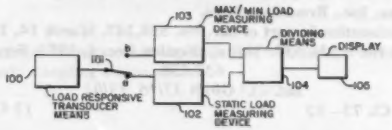
Jan Willem Hilbrands, Hattingen, Netherlands, assignor to Maschinenfabrik Koppern & Co., KG, Germany

Filed Dec. 24, 1974, Ser. No. 536,178

Claims priority, application Germany, May 18, 1974, 2423978

Int. Cl.² G01M 17/04

U.S. Cl. 73—11 16 Claims



1. A method for determining the behaviour of a shock absorber arranged within a wheel suspension unit within the sprung-mass-system of a vehicle, comprising the steps of measuring the static wheel load, causing the wheel to vibrate by applying forces to the wheel according to a predetermined relationship of amplitude to frequency, measuring at least one of the minimum and maximum value of the vertical contact force applied by the wheel to a support surface while subjecting the wheel to such applied forces as an indication of the minimum and maximum wheel load, respectively, and forming a dimensionless factor serving as an indication of the usability of the shock absorber by dividing one of the minimum and maximum wheel loads by the static wheel load.

4,002,052

METHOD FOR THE RAPID ANALYSIS OF A MIXTURE OF A NUMBER OF SUBSTANCES BY CHROMATOGRAPHY

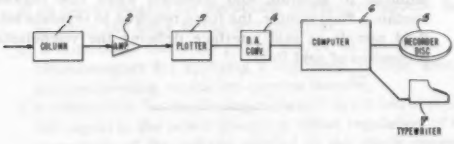
Jacques Bordet, Bouxieres aux Dames, and Jean-Paul Gourlia, Vandoeuvre, both of France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, Paris, France

Filed Apr. 18, 1975, Ser. No. 569,411

Claims priority, application France, Apr. 24, 1974, 74.14277

Int. Cl.² G01N 31/08

U.S. Cl. 73—23.1 2 Claims



1. A method of rapid analysis of a mixture of a predetermined number of known substances by chromatography wherein, in a first step, a chromatographic column having a retention time within the range of a few seconds to two minutes in the case of the most strongly retained substance is calibrated by passing separately through the column in the absence of each of the other substances used for the formation of the mixture which is to be subsequently analyzed in said column and by recording at the exit the pulse response of each separate substance aforesaid in respect of said column; in a second step, the mixture to be analyzed is passed through the same said column and the total pulse response corresponding to said mixture is recorded; in a third step, relating the total pulse response corresponding to the mixture and the specific pulse responses of each separate substance to determine the concentration of each separate substance aforesaid in the mixture, wherein in the first step and in the case of a given carrier gas flow velocity, the specific pulse response of each of said substances i aforesaid is sampled as it is being recorded and the values $h_i(t_j)$ of said response which is surface-normed are stored in memory at each sampling instant t_j; in the second step, the total pulse response corresponding to said mixture is sampled as it is being recorded and the values $x(t_j)$ of said response are stored in memory at each sampling instant t_j; in the third step, the concentration of each of the substances in the mixture is calculated by using the method of least squares by minimizing the sum:

$$S = \sum_{j=1}^{m} \left[x(t_j) - \sum_{i=1}^{n} \alpha_i h_i(t_j) \right]^2,$$

where m is the number of points sampled and α_i represents the mass of molar percentages of each of the n substances i in the mixture and there is then solved the system of n linear equations having n unknown quantities α_i corresponding to the equation $\delta S/\delta\alpha_i = 0$ in the case of each substance i from 1 to n.

4,002,053

METHOD AND APPARATUS FOR MEASURING DENSITY OF SUSPENSION

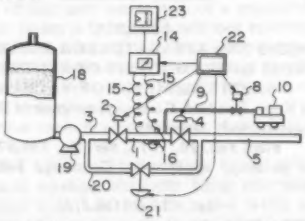
Noboru Hayakawa, Tokyo, Japan, assignor to Nishihara Environmental Sanitation Research Corporation Ltd., Japan

Filed Sept. 17, 1975, Ser. No. 614,434

Claims priority, application Japan, Sept. 20, 1974, 49-108446

Int. Cl.² G01N 9/24

U.S. Cl. 73—32 R 4 Claims



1. An apparatus for measuring the density of a suspension comprising a storage tank for the suspension; pipe means extending from the storage tank comprising an inlet pipe and an outlet pipe; an inlet valve and an outlet valve disposed on the pipe means in a spaced relation from each other to retain the suspension from the storage tank in a confined space in said pipe means when the inlet and outlet valves are in their closed position; a by-pass pipe by by-passing the inlet valve and the outlet valve, through which the suspension continuously fed from the storage tank flows when the suspension is confined in said pipe means between the inlet and outlet valves; means for changing the pressure of the confined suspension; means for measuring the density of the suspension, said means being mounted on the pipe means between the inlet and outlet valves; and a sequential circuit being adapted to control shut-off of the outlet valve and the inlet valve, and then to control operation of the pressure changing means to change the pressure of the confined suspension, and to control operation of the density measuring means by detecting the completion of the pressure change.

4,002,054

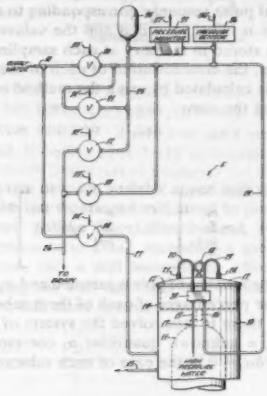
METHOD AND MEANS FOR VOLUMETRIC EXPANSION TESTING

Carl A. Grenci, 4791 Lesa Place, Yorba Linda, Calif. 92686

Filed Aug. 4, 1975, Ser. No. 601,847

Int. Cl.² G01M *3/36*

U.S. Cl. 73—37 **16 Claims**



1. Apparatus for hydrostatically testing the expansion of a vessel immersed in a fluid-filled jacket when subjected to an internal pressure comprising:

means for sensing weight including a sensing element;

fluid collection means operatively connected to said sensing element of said sensing means;

means for conducting the fluid expelled from said jacket when said pressure is applied to said vessel into said fluid collection means, said weight sensing means providing an indication of the volumetric change in said vessel; and

means permitting the fluid level in said fluid collection means to remain substantially constant as fluid is added to and removed therefrom.

4,002,055

PROCESS AND APPARATUS FOR TESTING THE TIGHTNESS OF SEAM JOINTS OF SYNTHETIC RESIN SHEETS BY MEANS OF VACUUM

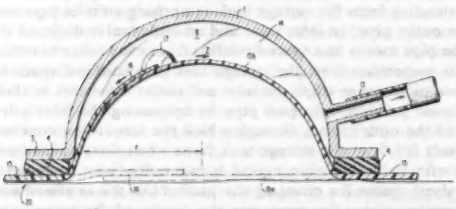
Friedrich Kops, Rondorf, Germany, assignor to Dynamit Nobel Aktiengesellschaft, Germany

Filed Feb. 20, 1973, Ser. No. 334,074

Claims priority, application Germany, Feb. 18, 1972, 2207648

Int. Cl.² G01M *3/12*

U.S. Cl. 73—40 **9 Claims**



1. An apparatus for testing the leakproofness of seam joints of synthetic resin sheets by a vacuum produced by a pump means in a testing chamber, which comprises a semi-cylindrical shell of a transparent material having rounded corners in the form of quarter spheres, said shell forming an opening at its underside, sealing strip means surrounding said opening, a continuous frame for engaging said strip means and a flexible closure means secured to said frame fro sealing off the opening by contacting the synthetic resin sheets whereby a test chamber is formed with said apparatus over a portion of the seam joint to be tested.

4,002,056

PROCESSES AND DEVICES FOR DETERMINING PROPERTIES OF VISCOUS FLUIDS

Louis Kopito, Brookline; Samuel R. Schuster, Wellesley, and Harold Kosasky, Brookline, all of Mass., assignors to Ovutime, Inc., Brookline, Mass.

Continuation-in-part of Ser. No. 558,247, March 14, 1975, Pat. No. 3,926,037. This application Dec. 4, 1975, Ser. No. 637,830

Int. Cl.² G01N *33/16*, *13/02*

U.S. Cl. 73—53 **12 Claims**

1. A device for determining the properties of bodily mucus comprising:

a. a pair of separable cooperating members, each said member having a working face defining a bearing surface characterized by non-planar elongated ridge increments characterized by ridge lines, said bearing surfaces in face to face relationship define a plurality of regions adapted to contain a fluid sample, said ridge lines of one of the bearing surfaces being crossed with respect to said ridge lines of the other of the bearing surfaces to intersect in a matrix of points, the surface area of said regions being greater that the surface area of the interface between said bearing surfaces; and

b. indicating means operatively connected to at least one of said members for providing an indication of the force required to separate said members when said regions contain a fluid sample, the force required to separate said fluid sample at said interface defining the viscoelastic properties of said fluid.

4,002,057

SAMPLING DEVICE

David H. Kannapell, Prospect, Ky., and Mervin L. Smith, Sellersburg, Ind., assignors to American Air Filter Company, Inc., Louisville, Ky.

Filed Dec. 5, 1975, Ser. No. 638,146

Int. Cl.² G01N *17/00*

U.S. Cl. 73—61.2 **7 Claims**

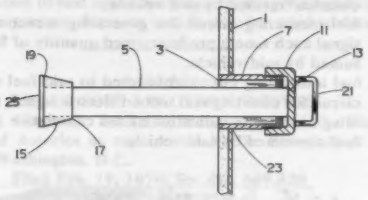
1. A sampling device comprising:

a vessel having a sampling aperture therein;

a coupling sleeve means surrounding said aperture and attached to said vessel and extending outwardly therefrom; and,

an elongated sample member longitudinally extending through said coupling sleeve means with sealing means at

each end thereof, the sealing means of the outer end of said sample member including a cap attached to said



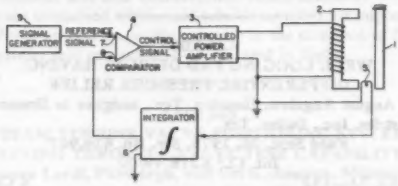
sample member, said cap including means for mating with said coupling sleeve means.

4,002,058

METHOD AND APPARATUS FOR VIBRATION OF A SPECIMEN BY CONTROLLED ELECTROMAGNETIC FORCE

John F. Wolfinger, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 3, 1976, Ser. No. 663,491
Int. Cl.² G01M *7/00*; G01N *29/00*
U.S. Cl. 73—71.5 R **7 Claims**



1. An apparatus for applying controlled electromagnetic force to a test specimen over a predetermined range of electromagnet excitation frequencies to effect vibration of the specimen comprising:

a. an electromagnet for producing an electromagnetic field to apply the force to the test specimen;

b. a controlled electrical power source connected to the electromagnet for applying a regulated voltage thereto and establishing excitation current therein;

c. a comparator for developing a control signal and applying this signal to the power source to effect regulation of the magnitude of the voltage applied to the electromagnet, said comparator having first and second inputs;

d. sensing means for measuring the flux density of the electromagnetic field and developing a first electrical signal having a magnitude and frequency representative of that of the applied force;

e. a signal generator for producing a reference electrical signal of predetermined magnitude at frequencies varying over a predetermined range;

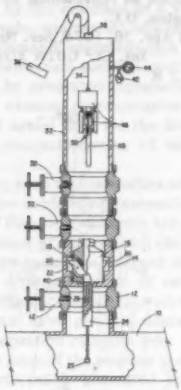
f. said first signal and said reference signal being applied to the first and second comparator inputs, respectively, said comparator effecting comparison of the signals for developing the control signal and applying the control signal to the power source to effect regulation of the magnitude of the voltage applied to the electromagnet to maintain the difference between the compared signals at a minimum.

4,002,059

APPARATUS FOR MANIPULATING CORROSION COUPONS AND THE LIKE

Mark A. Jeffers, Kenner, and Jackie D. Dendy, Lafayette, both of La., assignors to Standard Oil Company, Chicago, Ill.

Filed Feb. 18, 1976, Ser. No. 659,183
Int. Cl.² G01N *17/00*
U.S. Cl. 73—86 **3 Claims**



1. A static monitoring device manipulating apparatus for petroleum pipeline, a portion of which apparatus can be removed while the monitoring device is in said pipeline, said apparatus comprising:

a. a pipeline valve mounted generally on top of said pipeline;

b. a lock receiving section mounted on top of said pipeline valve;

c. a wireline lock means adapted to be fastenable in said lock receiving section;

d. a static monitoring device assembly mounted on the bottom of said lock means in such a manner that when said lock means is fastened in said lock receiving section that said static monitoring device assembly extends down through said pipeline valve and into said pipeline;

e. at least one wireline lock gripping tool to controllably grip said lock means;

f. an isolation valve mounted on top of said lock receiving section; and

g. a wireline lubricator fastened on top of said isolation valve, said wireline lubricator being adapted to being unfastened from said isolation valve while said static monitoring device assembly is extending into said pipeline.

4,002,060

PRESSURE MEASUREMENT SHEET AND METHOD OF USING THE SAME

Yasuhiro Ogata, and Hiroharu Matsukawa, both of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Oct. 29, 1975, Ser. No. 627,151
Claims priority, application Japan, Oct. 29, 1974, 49-125198
Int. Cl.² G01L *1/00*
U.S. Cl. 73—88 R **9 Claims**

1. A pressure measurement sheet comprising a support wherein a layer containing microcapsules containing a color former and a layer containing adsorbent are provided on the same or opposing sides of said support, wherein the ratio of the number average wall thickness (δ) to the volume average

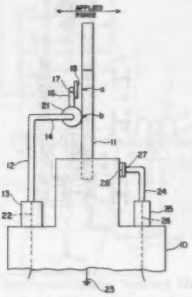
particle diameter (D) of the microcapsules lies in the range: δ/D=about 1.5×10^{-3} to about 3.0×10^{-2}.

4,002,061

CAPACITANCE TRANSDUCER FOR THE MEASUREMENT OF BENDING STRAINS AT ELEVATED TEMPERATURES

Hugh H. Smith, Oxon Hill, Md.; David J. Michel, and Paul Shahinian, both of Alexandria, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 30, 1976, Ser. No. 681,964
Int. Cl.² G01N *3/20*
U.S. Cl. 73—88.5 R **3 Claims**



1. A capacitance transducer for the measurement of bending strains of a test specimen which comprises:

means for supporting said test specimen in a vertical plane;

a high-temperature-alloy, electrical conductor spring wire supported at one end and having a U-shaped portion at the unsupported end with the U in a vertical plane parallel with the plane in which said specimen is supported;

a high-temperature-type insulator surrounding the inner electrical leg portion of said U-shaped end and adapted to be in contact with said test specimen;

a metal plate secured to and along the outer leg of said U-shaped portion of said wire conductor with said metal plate extending in a vertical plane parallel with the vertical plane of said U-shaped end and said specimen;

a second high-temperature-alloy, spring-wire, electrical conductor supported at one end with its unsupported end adjacent said test specimen supporting means and near the supported end of said specimen;

a flat metal plate secured to and along said unsupported end of said second electrically conductive wire parallel to said test specimen supporting means;

whereby the deflection of said specimen is determined by changes in capacitance between said metal plate on said U-shaped end of said conductive wire and said specimen and said deflection is calibrated into strain.

4,002,062

AVERAGE FUEL CONSUMPTION RATE MEASURING SYSTEM

Akira Kuno, Nagoya; Yoshio Shinoda, Okazaki, and Hiroshi Arai, Toyota, all of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Sept. 25, 1975, Ser. No. 616,819
Claims priority, application Japan, Oct. 5, 1974, 49-114853
Int. Cl.² G01F *9/00*
U.S. Cl. 73—114 **5 Claims**

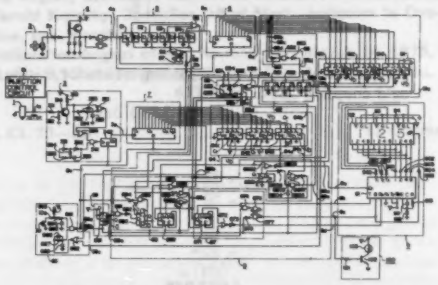
1. An average fuel consumption rate measuring system comprising:

a distance measuring circuit for generating a first electric signal each time a predetermined distance is traveled by a running vehicle;

a distance integrating circuit connected to said distance measuring circuit for counting said first electric signals to form an integrated value indicative of the cumulative distance traveled by said vehicle;

a fuel measuring circuit for generating a second electric signal each time a predetermined quantity of fuel is consumed by said vehicle;

a fuel integrating circuit connected to said fuel measuring circuit for counting said second electric signals to form an integrated value indicative of the cumulative amount of fuel consumed by said vehicle;



a divider circuit connected to said distance integrating circuit and said fuel integrating circuit for repetitively obtaining an average fuel consumption rate by dividing the integrated cumulative value of one of said integrating circuits by that of the other of said integrating circuits each time a selected one of the integrated cumulative values increases by a predetermined value; and

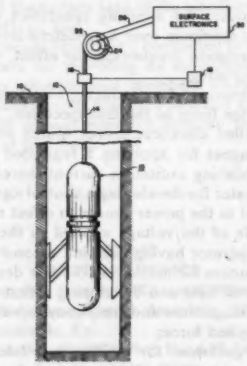
an indication circuit connected to said divider circuit to indicate the result of said division by said divider circuit.

4,002,063

WELL LOGGING PAD DEVICES HAVING DIFFERENTIAL PRESSURE RELIEF

Jorg August Angehrn, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Sept. 26, 1975, Ser. No. 616,967
Int. Cl.² E21B *49/00*
U.S. Cl. 73—152 **4 Claims**



1. An apparatus for investigating earth formations traversed by a borehole, comprising:

an elongated support member adapted for movement through a borehole; and

an auxiliary pad member connected to said support member and adapted to be urged against the borehole wall, said pad member having first and second surfaces, said first surface including at least one electrode and adapted to

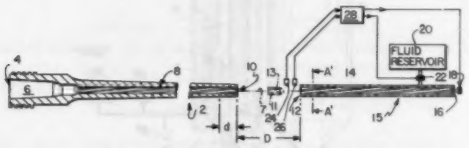
engage the borehole wall, and said pad member having at least one fluid channel between said first and second surfaces adapted to be continuously open during the operation of said apparatus for preventing the build-up of excess pressure between said first and second surfaces.

4,002,064

RIFLED SOFT RECOVERY SYSTEM

Herbert D. Curchack, Rockville, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 19, 1976, Ser. No. 659,320
Int. Cl.² G01L 5/14
U.S. Cl. 73—167 **12 Claims**



1. A system for decelerating a projectile in flight, having rifle engravings thereon, fired by a gun bore rifled with a land pattern having a characteristic number of turns per bore diameter, whose muzzle has a first angular orientation along the projectile's flight axis, the gun having a characteristic recoil distance, comprising:

a tubular member having an opened end at a first distance from said gun muzzle, with a rifled land pattern having a second angular orientation at said opened end, about said projectile flight axis, displaced from said first angular orientation substantially by the project of said characteristic turns per bore diameter times the sum of said first distance and said characteristic recoil distance;

means contained within said tubular member for imposing a force on said projectile opposite to the direction of flight;

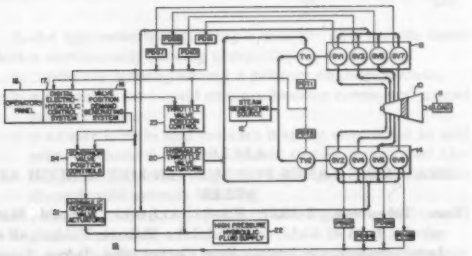
whereby said projectile is decelerated in flight.

4,002,065

STEAM TURBINE VALVE POSITIONING SYSTEM HAVING THROTTLE VALVE TEST CAPABILITY

Francesco Lardi, Pittsburgh, and Uri G. Ronnen, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 27, 1975, Ser. No. 591,245
Int. Cl.² G01L 27/00
U.S. Cl. 73—168 **13 Claims**



1. A system for testing a main steam inlet valve for a steam turbine by closing and opening the valve during operation of the turbine without disturbing the required flow of steam to the turbine for a predetermined load, comprising:

a. a main steam inlet valve;

b. at least one position controllable valve downstream of the main inlet valve;

c. at least one position controllable valve connected to control the flow of steam to the turbine in a path parallel to the main inlet valve;

d. means to generate a representation of total steam flow demand to the turbine;

e. means to select in the alternative a single and sequential mode of operation for the position controllable valves;

f. means governed by the total steam flow demand representation to generate for each of the position controllable valves a representation of valve lift, said representation being based upon a characterization of valve steam flow versus valve lift in accordance with the selected single or sequential mode of operation;

g. means governed by the initiation of a valve test for the main steam inlet valve to generate repetitively a predetermined position demand representation of incremental closure of the downstream position controllable valve;

h. means governed by generated representations including the incremental closure representation to generate a representation of actual flow for the downstream valve based upon the characterization of valve steam flow versus valve lift;

i. means governed by each representation of actual flow and the total steam flow demand representation to generate a representation of flow demand error created by the generated representation of incremental closure;

j. means governed by each flow demand error representation to generate a representation of valve position demand for the position controllable valve in the parallel path, said governor valve position demand being based upon the characterization of steam flow versus valve lift;

k. means to position each of the position controllable valves in accordance with each generated respective downstream position demand and the parallel path position demand representations; and

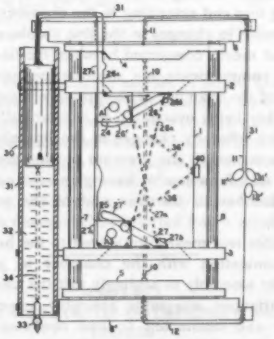
l. means to close and open the main inlet valve when the downstream valve is closed.

4,002,066

OCEANOGRAPHIC WATER SAMPLER

Edward Ratigan, 170 Birch Hill Road, Locust Valley, N.Y. 11560

Filed Mar. 4, 1976, Ser. No. 663,914
Int. Cl.² G01N 1/12
U.S. Cl. 73—170 A **6 Claims**



1. Oceanographic water sampling means comprising, a container, cable means connected to the container to locate the container at a predetermined location in an ocean,

cover means closably mounted on the container,

means connected to close the cover means to trap a water sample, and

means to add chemicals to the trapped water in the container at the same location where the sample is taken.

4,002,067

LOW FRICTION ABSOLUTE PRESSURE CONTINUOUS INTEGRATOR

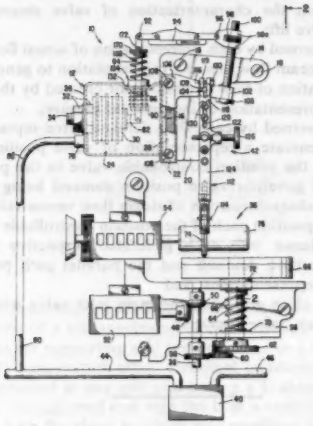
Carl John Kugler, Philadelphia, Pa., assignor to The Singer Company, New York, N.Y.

Continuation-in-part of Ser. No. 472,246, May 22, 1974, Pat. No. 3,946,609. This application Dec. 10, 1975, Ser. No. 639,557

The portion of the term of this patent subsequent to Mar. 20, 1990, has been disclaimed.

Int. Cl.² G01F 1/12

U.S. Cl. 73—233 **8 Claims**



1. An absolute pressure continuous integrator device for measuring the absolute pressure of the volume of the throughput fluid flow of a line having a meter connected therein, which device comprises:

a. a housing having a chamber sealed from atmospheric pressure therein,

b. a pressure sensing means mounted in the housing and having one end extending in the chamber freely to move responsive to changes in the line absolute pressure,

c. conduit means connected between the line and the housing to communicate line absolute pressure to one or the other of the chamber or the pressure sensing means, with the other being evacuated to substantially zero absolute pressure whereby changes in the line absolute pressure will be sensed by the pressure sensing means,

d. a link transfer assembly having one end connected within the chamber to the free end of the pressure sensing means,

e. a flexible seal means connected to the housing in sealed communication with the chamber to permit the link transfer assembly to sealingly exit the chamber,

f. a continuous integrator assembly associated with the meter and connected to and operated responsive of movements of the other end of the link transfer assembly,

g. the link transfer assembly includes a transfer link which sealingly exits the chamber at the seal means, and

h. a support assembly sealingly interconnected between the housing and the transfer link, and to shift in substantially friction-free, non-lineal movement responsive to changes of the position of the pressure sensing means, to cause the transfer link of the link transfer assembly to shift correspondingly.

4,002,068

LEVEL-SENSITIVE SYSTEM

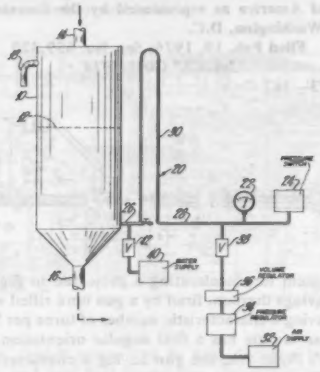
John A. Borst, San Jose, Calif., assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Apr. 24, 1974, Ser. No. 463,473

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² G01F 23/16

U.S. Cl. 73—302 **1 Claim**



1. In combination, a container for a liquid, the level of which is subject to rising and falling, a device sensitive to the level of the liquid in the container, passage means connecting the device to a lower portion of said container, means for supplying gas under pressure to said passage means to effect a flow of gas into said container through said passage means, and means for supplying liquid under pressure through said passage means to said container, at a rate of 10 cc per minute to 2 gallons per hour, to effect a combined flow of liquid and gas into said container and through said passage means downstream of the liquid introduction site.

4,002,069

MEASURING LANCE FOR MOLTEN METAL SUCH AS STEEL

Yozo Takemura, Tohkai; Eisuke Akiyoshi; Hiroshi Matsukubo, both of Aichi, and Toshihiko Shibata, Tohkai, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

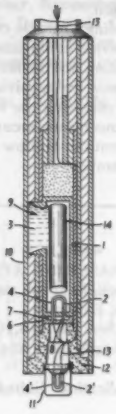
Filed May 14, 1975, Ser. No. 577,160

Int. Cl.² G01K 13/12

U.S. Cl. 73—354 **9 Claims**

1. A measuring lance to be inserted into molten metal which comprises an expendable body, a first thermocouple protected by a first tube mounted on one end of the body, a receptacle chamber for receiving the molten metal provided inside the body, a second thermocouple protected by a second tube mounted at the bottom of said chamber and projected in the upside-down direction relative to the projecting direction of

the first thermocouple, and a path for the molten metal leading to said chamber, characterized in that one or both opening



ends of said second tube are positioned in a porous brick provided below the receptacle chamber.

4,002,070

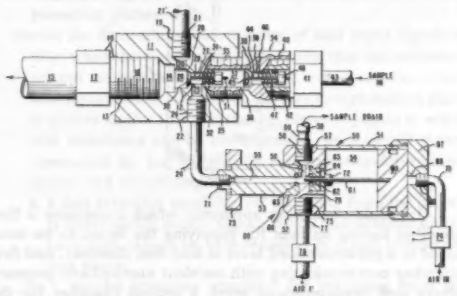
SAMPLE INJECTION SYSTEM

Gary W. Howell, Elkton, Md., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 26, 1975, Ser. No. 553,427

Int. Cl.² G01N *1/14*

U.S. Cl. 73—422 GC **7 Claims**



1. An apparatus for injecting a quantity of a sample liquid into a continuously flowing carrier liquid, comprising:

a. a primary housing having a primary channel therein;

b. a carrier outlet in said primary housing connected to said primary channel;

c. a carrier inlet in said primary housing connected to said primary channel adjacent to said carrier outlet, said carrier inlet and outlet together forming a carrier conduit through said primary housing;

d. a sample outlet in said primary housing connected to said primary channel;

e. a sample inlet in said primary housing connected to said primary channel adjacent to said sample outlet, said sample inlet and outlet together forming a sample conduit through said primary housing;

f. a primary pressure relief valve disposed within said primary housing in said primary channel between said sample conduit and said carrier conduit, said primary pressure relief valve being biased to the normally closed position to prevent intermixing of liquid flowing in said sample conduit and the liquid flowing in said carrier conduit; and

g. means to change the pressure differential between the liquid flowing in said carrier conduit and the liquid flowing in said sample conduit to the point where the primary pressure relief valve opens to admit sample liquid into said carrier conduit, said means comprising

i. a pumping system comprising a housing, and a motor cylinder, first and second channels, and a sample drain orifice all formed in said housing, said first channel being a cylindrical pump channel with an axis parallel to the axis of said motor cylinder, one end of said pump channel being connected to said motor cylinder and the other end being connected to said sample outlet, one end of said second channel being connected to said pump channel at a point adjacent to the connection of said first channel to said motor cylinder and the other end of said second channel being connected to said sample drain orifice, said first and second channels forming a continuous path from said sample outlet to said sample drain orifice;

ii. a piston movably mounted in said motor cylinder;

iii. a cylindrical rod carried by said piston and extending into said first channel;

iv. means to seal said cylindrical rod to the walls of said first channel in movable, leak-tight association, the end of said rod disposed within said first channel being normally positioned between the point at which said first channel is connected to said motor cylinder and the point at which said first channel is connected to said second channel; and

v. means to move said piston in said motor cylinder and thereby move said rod in said first channel.

4,002,071

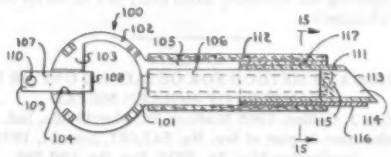
DEVICE AND METHOD FOR OBTAINING ONE OR MORE SAMPLES OF LIQUID

William J. Collins, 7005 Madison St., Merrillville, Ind. 46410

Filed Jan. 24, 1975, Ser. No. 543,687

Int. Cl.² G01N *1/12*

U.S. Cl. 73—425.4 R **15 Claims**



1. A device for obtaining a sample of liquid from a supply thereof, said device comprising wall structure forming a chamber, tubular means communicating with and extending from said chamber and having an outer exposed extremity provided with an entrance through which liquid initially received may be caused to flow into said chamber, and means for supporting at least a portion of said outer extremity adjacent the entrance against possible damage when inserted into a supply of liquid.

4,002,072

DEVICE AND METHOD OF OBTAINING A SAMPLE OF LIQUID

William J. Collins, 7005 Madison St., Merrillville, Ind. 46410

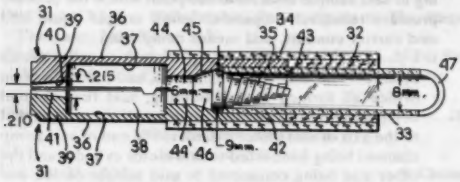
Filed Mar. 31, 1975, Ser. No. 563,590

Int. Cl.² G01N *1/12*

U.S. Cl. 73—425.6 **21 Claims**

1. A device of the character described for obtaining a sample of molten metal, said device comprising structure provided with an unevacuated chamber and an integral tubular formation extending therefrom, a tube disposed in axial relation to said tubular formation for initially receiving molten metal for

flow into said chamber, buffer means held against a portion of said tubular formation by an inner end of said tube, and tubular means embracing at least a portion of said tubular formation for holding the components assembled.



4,002,073

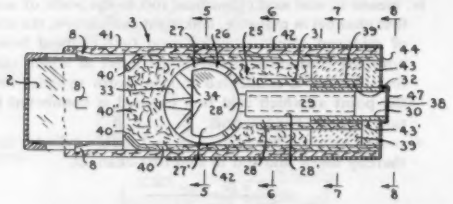
MOLTEN METAL SAMPLER

William J. Collins, 7005 Madison St., Merrillville, Ind. 46410

Filed July 11, 1975, Ser. No. 595,155

Int. Cl.² G01N 1/12

U.S. Cl. 73—425.4 R 18 Claims



1. A device for obtaining a sample of hot liquid, said device comprising wall structure forming a primary chamber and a secondary chamber for successively receiving such a liquid, tubular structure extending from and communicatively connected to said primary chamber, a tubular casing substantially multisided in cross-section, surrounding and supporting said wall structure, a support fixed in said coating and provided with an opening, and said tubular structure being disposed in said opening and affording initial entry of a liquid for flow into said chambers.

4,002,074

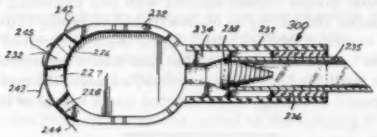
DEVICE AND METHOD FOR OBTAINING ONE OR MORE SAMPLES OF MOLLEN METAL

William J. Collins, 7005 Madison St., Merrillville, Ind. 46410

Continuation-in-part of Ser. No. 543,687, Jan. 24, 1975. This application May 26, 1976, Ser. No. 690,296

Int. Cl.² G01N 1/12

U.S. Cl. 73—425.4 R 26 Claims



2. Structure constituting a subassembly of a device for obtaining a sample of molten metal, said subassembly comprising a pair of half sections, each of said sections having a head provided with a recess and an extended portion provided with a groove, said head of each section also having a relatively thick chordal portion provided with a longitudinal groove spaced from the groove in the extended portion, the arrangement being such that when said sections are correctly assembled, said recesses and the grooves in the extended portions will respectively form a primary chamber and an opening, and said grooves in said chordal portions will form a secondary chamber for receiving metal from said primary chamber whereby to obtain a sample substantially entirely within the confines of said chambers and head to form a large portion and a smaller portion of a predetermined size extending from said large portion.

18. A device for obtaining a sample of molten material from a supply thereof, said device comprising a casing, wall structure disposed in said casing and forming a primary chamber provided with an entrance for receiving the material and a secondary chamber for receiving the material from said primary chamber, and fibrous means secured in said casing serving to substantially prevent the outflow of the molten material from said secondary chamber.

4,002,075

LIQUID-MEASURING APPARATUS

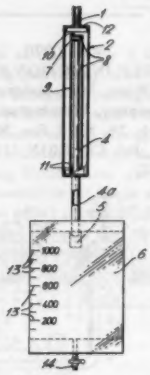
David E. Cross, Folkestone, England, assignor to Smiths Industries Limited, London, England

Continuation-in-part of Ser. No. 378,100, July 11, 1973, Pat. No. 3,888,126. This application Aug. 15, 1975, Ser. No. 605,106

Claims priority, application United Kingdom, Aug. 16, 1974, 36164/74

Int. Cl.² G01F 19/00

U.S. Cl. 73—426 12 Claims



1. In liquid-measuring apparatus which comprises a first chamber having an inlet for supplying the liquid to be measured to a predetermined level in said first chamber, said first chamber communicating with ambient atmospheric pressure above said predetermined level, a second chamber for the liquid being measured, said second chamber having a substantially larger liquid-holding capacity than said first chamber, and a passageway intercoupling the two chambers for automatically conveying selected increments of the liquid being measured from the first chamber to the second chamber, said passageway opening into said first chamber below said predetermined level and including a first portion extending upwardly to said predetermined level and a second portion extending downwardly from the said predetermined level to said second chamber so as thereby to provide an automatic siphon for draining a predetermined unit quantity of the liquid out of the said first chamber and into said second chamber in response to the liquid content of the said first chamber reaching said predetermined level: the improvement wherein the said upwardly-extending first portion of said passageway comprises a compartment within said first chamber, said compartment being open to said first chamber below said predetermined level and being closed to said first chamber above said predetermined level, and wherein the said downwardly-extending second portion of said passageway comprises tubular means which opens at said predetermined level within said compartment of said first chamber.

4,002,076

METHOD AND CIRCUIT FOR USE IN DETERMINING UNBALANCE OF A ROTARY BODY

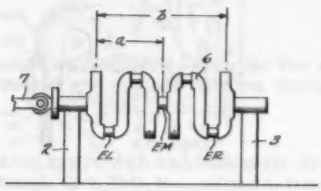
Hermann Brunnengraber, Heppenheim, Germany, assignor to Gebr. Hofmann KG, Darmstadt, Germany

Filed Apr. 26, 1976, Ser. No. 680,127

Claims priority, application Germany, Apr. 30, 1975, 2519356

Int. Cl.² G01M 1/22

U.S. Cl. 73—462 7 Claims



3. For a balancing machine, a circuit for determining unbalance of a rotary body which is of a structural configuration providing structurally predetermined compensation planes and restricted angular regions thereof, for compensation of such unbalance, the circuit comprising:

input means for receiving electrical signals characterizing unbalance detected on the rotary body and converting said input signals to the structurally predetermined compensation planes; and

means for determining the polarity of said input signals so that, when the signal polarity indicates that the unbalance cannot be compensated in a said compensation plane, said signals are converted to another compensation plane or planes and/or to a substitution plane or planes in which said unbalance can be compensated, by a circuit means connected to the output of said polarity-determining means and comprising:

a. a first inverting amplifier for receiving from the polarity-determining means signals which characterize unbalance that cannot be compensated in a said compensation plane;

b. a second inverting amplifier for receiving from the polarity-determining means signals which characterize unbalance that cannot be compensated in a second said compensation plane;

c. a third inverting amplifier operatively connected to the output of said first inverting amplifier;

d. means for varying the output of said third inverting amplifier as a function of the distance of the substitution plane from a said compensation plane; and

e. means connecting the output of said first inverting amplifier to the input of said second inverting amplifier;

whereby, in operation, the output of the first inverting amplifier is added by way of the third inverting amplifier to the output of the second inverting amplifier and the output of the first inverting amplifier is applied to the input to the second inverting amplifier, such that the output of the second inverting amplifier is available for use in unbalance compensation in said substitution plane and the result of the operation of adding the outputs of the first and second amplifiers is available for use in unbalance compensation in said other compensation plane.

4,002,077

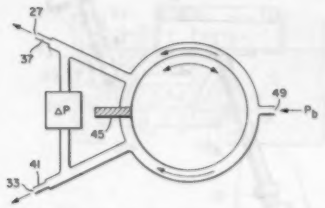
INTEGRATING ANGULAR ACCELEROMETER

Lael Brent Taplin, Royal Oak, Mich., assignor to The Bendix Corporation, South Bend, Ind.

Filed Mar. 6, 1975, Ser. No. 555,924

Int. Cl.² G01P 3/26, 15/02

U.S. Cl. 73—503 28 Claims



1. An integrating angular accelerometer for measuring angular rate of a rotating body, comprising a housing, an inertial mass positioned in the housing and arranged for relative rotation with respect to the housing, a viscous fluid in the housing, the inertial mass and housing forming an annular channel therebetween located about the acceleration sensitive axis and dimensioned to cause fluid flow upon relative rotation of the housing and inertial mass in the direction of relative rotation, means for blocking fluid flow in the channel to provide a differential pressure across the block means corresponding to relative angular rotation of the inertial mass and housing, and means for sensing the differential pressure across the blocking means to provide a signal corresponding thereto.

4,002,078

DYNAMICALLY TUNED GYROSCOPES

Ivor Lewis Thomas, Wigan, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Feb. 13, 1975, Ser. No. 549,676

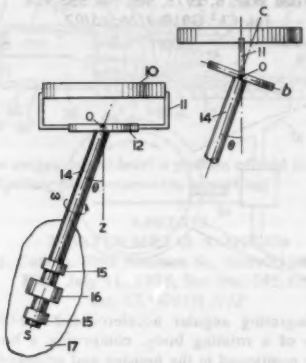
Claims priority, application United Kingdom, Feb. 14, 1974, 6804/74

Int. Cl.² G01C 19/16

U.S. Cl. 74—5 R 6 Claims

1. A dynamically tuned gyroscope comprising a rotor to be rotated, a driving member rotatable about an axis fixed therein, a single gimbal member, first torsion flexure means extending along a first axis of symmetry of said gimbal member and connecting said driving member to said gimbal member, a second torsion flexure means extending along a second axis of symmetry of said gimbal member, said first and second axes of symmetry being at right angles to each other, said second torsion flexure means connecting said gimbal to said rotor and having an effective torsional stiffness K_s equal to $4w^2 r_3^2 m_3$ where w is the tuned rotational speed of said rotor, m_3 is the component mass of said gimbal on an axis through the centre of gravity of the gimbal and normal to said first and

second axes of symmetry and r_3 is the distance of the component mass m_3 from the centre of gravity of the gimbal, and



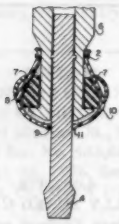
means for making the effective torsional stiffness K_1 of said first torsion flexure means zero.

4,002,079

BREATHING PROTECTOR BOOT FOR IMPACTOR TOOLS

William A. Hall, Rte. 1, Box 310-A, Anniston, Ala. 36201

Filed Aug. 27, 1975, Ser. No. 608,369
Int. Cl.² F16J 15/50
U.S. Cl. 74—18.2 4 Claims



1. An air-vented boot adapted for protecting the lower housing of an impactor tool comprising in combination:

A. A thine-walled symmetrical elastomeric body having a vertical axis or revolution, and further including:

B. An upper annular surface defining a first horizontal disposed opening in said body adapted to be clamped around the lower end of an impactor housing, and a lower annular surface defining a second horizontally disposed opening and adapted to be distensibly engaged around, and against relative movement to, the shaft of an impactor bit; and,

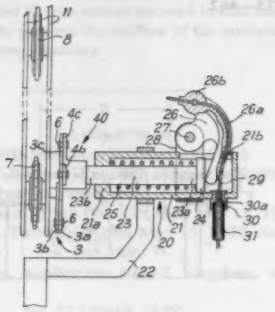
C. Aperture means defining at least one air vent through the wall of said body between said first and second openings, said aperture means including a protector lobe formed external to, and in partial encompassing relation over, said air vent opening in said body whereby said air-vented boot is operable to pump an air flow within and without said boot during oscillation of said breaker bit.

4,002,080

DERAILLEUR GEAR FOR A BICYCLE

Roger Huret, and Jacques Huret, both of 60, avenue Felix Faure, 92000 Nanterre, France

Filed Feb. 19, 1975, Ser. No. 551,018
The portion of the term of this patent subsequent to July 29, 1993, has been disclaimed.
Int. Cl.² F16H 7/22, 9/24
U.S. Cl. 74—217 B 12 Claims



1. A derailleur gear for a bicycle comprising:

a. displacement means (1 or 20) including a first part (1*a* or 2*l*) rigidly attached to a frame part of a bicycle and a second part (4 or 40) connected to and supported by the first part and displaceable with respect to said first part in a direction generally transversely to the plane of the rear wheel of the bicycle;

b. a support parallelogram linkage (3) including a vertically movable portion (3*a*, 3*b*, 3*c*) disposed generally in a plane perpendicular to the axis of the rear wheel of the bicycle, said vertically movable portion being pivotally connected to and supported by said second part of said displacement means, said second part comprising a rigid connecting side link of said support parallelogram linkage;

c. a spindle (9) carried by said vertically movable portion of said support parallelogram linkage, said spindle extending in a direction transverse to the plane of the rear wheel of the bicycle;

d. a chain guide sprocket (7) ratatably mounted on said spindle;

e. an elongated arm member (11) pivotally connected to said vertically movable portion of said support parallelogram linkage for movement about an axis transverse to the plane of the rear wheel of the bicycle; and

f. a chain tension pulley (8) rotatably supported by said arm member.

4,002,081

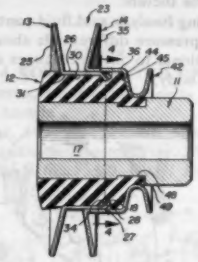
PULLEY CONSTRUCTION

Edward H. Schultz, Jr., Glencoe, Ill., assignor to Nagel-Chase Manufacturing Company, Chicago, Ill.

Filed Jan. 12, 1976, Ser. No. 648,248
Int. Cl.² F16H 55/44, 55/49
U.S. Cl. 74—230.8 11 Claims

1. A pulley, comprising the combination of a hub, a firmly resilient collar affixed to the hub and having an annular surface having a groove formed therein, a first annular sheet metal member having an outwardly flared margin and a bi-ended bushing portion axially extending from the flared margin to an annular, radially inwardly extending free end adapted for engagement with the collar groove, the bushing having an inner surface for engaging the collar outer surface with an axially extending press fit, the pulley further comprising a second annular sheet metal member having an outwardly flared margin adapted to oppose the first sheet metal member

margin and form therewith a groove for accommodating a belt, and a bi-ended sleeve portion axially extending from the



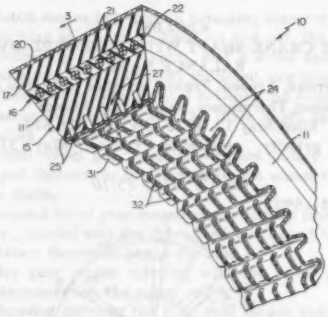
flared margin and adapted to engage the first sheet metal member bushing with an axially extending, nesting fit.

4,002,082

ENDLESS POWER TRANSMISSION BELT

Dale L. Waugh, Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio

Filed Sept. 17, 1975, Ser. No. 614,293
Int. Cl.² F16G 1/28, 5/16, 5/00
U.S. Cl. 74—231 C 18 Claims



1. An endless power transmission belt made primarily of elastomeric material and having a compression section comprising a plurality of teeth defining the inside portion of said belt and extending perpendicular to the endless path of said belt, each of said teeth having at least one groove extending therethrough substantially transverse thereto and extending parallel to said endless path.

4,002,083

BALANCED COMPONENT OPERATIVE WITH AN ASSOCIATED SHAFT FOR RELATIVE POSITIONING MOVEMENT THEREBETWEEN

Harry Glicken, 333 Trotting Road, Union, N.J. 07083

Filed Dec. 11, 1975, Ser. No. 639,852
Int. Cl.² F16H 55/22, 27/02, 1/8, 1/20
U.S. Cl. 74—459 31 Claims

1. A component for use on a shaft having transport means thereon comprising,

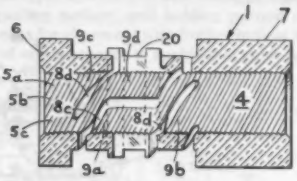
a. a member having a bore therethrough,

b. matching transport means formed in the member substantially along the length of said bore to permit said component to be mounted for movement to and fro relative the transport means of the associated shaft,

c. a plurality of circumferentially spaced slots cut through the wall of said member each generally having a length less than the member.

d. said slots defining a plurality of circumferentially spaced connecting members on the member each of which connecting members is disposed between an adjacent pair of slots, and

e. means about the medial section of said component and transverse to the longitudinal line thereof for exerting



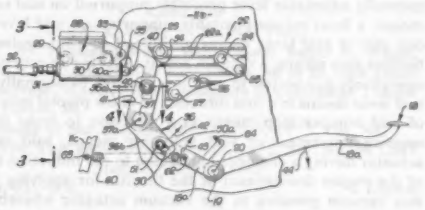
compressive forces on the connecting members and to provide a predetermined engagement forces for balanced relative movement between the matching transport means or the component and the transport mean on the associated shaft.

4,002,084

MOTORCYCLE BRAKING LINKAGE

Samuel J. Martins, Reseda, Calif., assignor to Airheart Products, Inc., Chatsworth, Calif.

Filed July 30, 1975, Ser. No. 600,389
Int. Cl.² G05G 1/04, 1/14
U.S. Cl. 74—512 6 Claims



1. For combination with a motorcycle having a frame, a wheel braking surface, a braking pad, a fluid pressure responsive actuator operable to urge the pad against said surface, and a pivotally mounted brake pedal, the combination comprising

a. a mount adapted for attachment to the frame,

b. a braking cylinder on the mount and having a pressurized fluid outlet communicable with said actuator and a plunger movable relative to the cylinder to pressurize fluid therein,

c. a plunger actuating lever pivotally connected to the mount to swing between retracted position relative to the cylinder and advanced position in which the plunger is moved to pressurize fluid in the cylinder,

d. and a crank pivotally connected to the mount, the crank having a first arm with lost motion pivotal connection to said actuating lever, and a second arm with operative connection to said brake pedal, said lost motion connection increasing the mechanical advantage of force transmission from the crank to the actuating lever as the crank is rotated counterclockwise by the pedal to swing the actuating lever from retracted to advanced position,

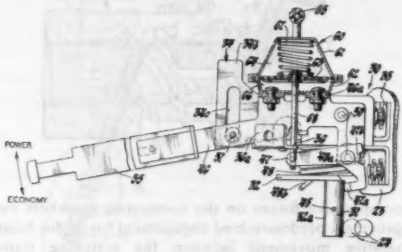
e. said crank defining a pivot axis, said lost motion connection including a guide shoulder and a follower movable lengthwise along said guide shoulder relatively close to said axis as the crank pivots counterclockwise, the guide shoulder and follower respectively located on said crank first arm and on said actuating lever.

4,002,085

ACCELERATOR CONTROL ASSEMBLY

Daniel U. Johnston, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed May 8, 1975, Ser. No. 575,610
Int. Cl.² G05G *11/00*
U.S. Cl. 74—513 **5 Claims**



1. In an automotive vehicle having an internal combustion engine with an induction system including a movable throttle and a driver operated actuating means operatively connected to the throttle to effect opening movement of the throttle, an accelerator control assembly operative to provide a force signal to the vehicle operator indicating proper throttle settings for economical engine operation, said accelerator control assembly including a support means, a shiftable bumper stop means pivotably supported by said support means and positioned in the path of movement of said actuating means and engageable by said actuating means when said actuating means is moved to effect opening movement of the throttle, a manually adjustable lever pivotably supported on said support means, a lever means pivotably supported on said lever with one end of said lever means positioned to abut against said bumper stop means, a vacuum actuator having an actuator rod operatively connected to said lever means to normally pivot said lever means in a first direction to allow pivotal movement of said bumper stop means in a direction to resist throttle opening movement of said actuating means, said vacuum actuator having a chamber connected to the induction system of the engine downstream of the throttle for applying induction vacuum pressure to the vacuum actuator whereby at a predetermined vacuum pressure said vacuum actuator will effect pivotal movement of said lever means in a second direction to effect pivotal movement of said bumper stop means in a direction to permit increased throttle opening movement of said actuating means and, coiled spring means operatively connected at one end to said bumper stop means and at its other end to said lever and to said lever means to normally bias said bumper stop means in a direction to resist throttle opening movement of said actuating means and to effect pivotal movement of said lever and said lever means in a direction for said one end of said lever means to abut against said bumper stop means.

4,002,086

DEVICE FOR AUTOMATIC CORRECTION OF UNBALANCE IN RAPIDLY ROTATING MACHINE ELEMENTS

Rolf Bertil Reinhall, Killingevagen 16, 181 64 Lidingo, Sweden

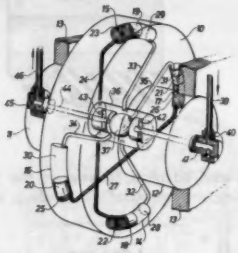
Continuation of Ser. No. 363,016, May 23, 1973. This application June 25, 1975, Ser. No. 590,398
Claims priority, application Sweden, June 6, 1972, 7433/72
Int. Cl.² F16F *15/22*
U.S. Cl. 74—573 F **13 Claims**

1. A device for counteracting imbalances in a rotary body and automatically restoring it to be balanced condition, comprising:

a. an axial bore in said rotary body forming a reservoir and containing a fluid medium;

b. a plurality of chambers disposed about said bore at spaced distances therefrom and each having a balancing mass movable therein;

c. means floating freely in said fluid containing reservoir for developing pressure differentials about the axis of rotation proportional to any imbalances arising during rotation of said body;



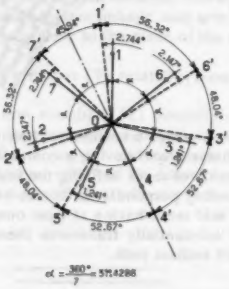
d. means for transmitting said pressure differentials to said balancing masses to displace the latter in said chambers a distance proportional to the pressure differentials and being effective to restore said body to a balanced condition.

4,002,087

MACHINE CRANK-SHAFT WITH IMPROVED DYNAMIC BALANCE RATIO

Michel Ferrand, Ecouen, France, assignor to Societe d'Etudes de Machines Thermiques, Saint Denis, France

Filed May 12, 1975, Ser. No. 576,560
Claims priority, application France, May 31, 1974, 74.19053
Int. Cl.² F16F *15/10*
U.S. Cl. 74—595 **1 Claim**



1. A seven-throw crank-shaft provided with substantially identical balancing counterweights for a four-cycle internal combustion engine with at least one bank of seven cylinders arranged in a cylindrical position sequence numbered 1-2-3-4-5-6-7 to be fired according to an ignition sequence 1-6-3-4-5-2-7 comprising crank throws whose crank position sequence along said crank-shaft corresponds to said cylinder position sequence and wrist pins for the crank throws and wherein when viewed endwise of said crank-shaft in orthogonal projection on a radial plane perpendicular to the longitudinal axis of rotation of said crank-shaft, said crank-throws are angularly spaced from each other successively arranged about said axis of rotation in the same order as said ignition sequence when travelling in a single circumferential direction about said axis, each of three pairs of said crank-throws 1–7, 6–2, 3–5 being respectively symmetrical with respect to the longitudinal axial center plane passing through the wrist-pin of a middle crank-throw 4 and through said axis of rotation and wherein the crank-throws of said three pairs respectively

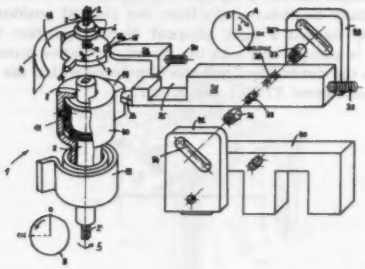
make angles of 157.03°; 100.71° and 52.67° with said axial center plane as measured from said center plane of said middle crank-throw 4.

4,002,088

CLUTCH FOR A ROTARY SWITCH DRIVE SHAFT

Gottfried Alsch, Vienna, Austria, assignor to Hubert Laurenz Naimer, Vienna, Austria

Filed Apr. 10, 1975, Ser. No. 566,993
Claims priority, application Austria, Apr. 25, 1974, 3421/74
Int. Cl.² F16H *57/10*; H01H *3/00*
U.S. Cl. 74—777 10 Claims



1. A clutch means between an actuating element for selectively switching an electric switch on and off, the actuating element including a rotary shaft, and a drive shaft for the switch, the shafts being coaxially mounted, comprising

1. a differential gearing coupled between the rotary shaft of the actuating element and the drive shaft, the gearing including
   a. a first bevel gear coaxial with the rotary shaft and keyed thereto for rotation therewith about the axis of the shafts,
   b. a second bevel gear means axially spaced from the first gear, coaxial with the drive shaft and keyed thereto for rotation therewith about the axis,
   c. idler gear means meshing with the bevel gears and interconnecting the same, and
   d. a housing carrying the idler gear means and mounted for rotation about the axis,
2. a releasable latch means arranged selectively to permit and stop rotation of the gearing housing,
3. an exterior housing surrounding the gearing housing, and
4. spring means connected between the gearing housing and the exterior housing, the spring means being biased to press the gearing housing against the latch means to prevent rotation of the gearing housing.

4,002,089

ADJUSTMENT MEANS

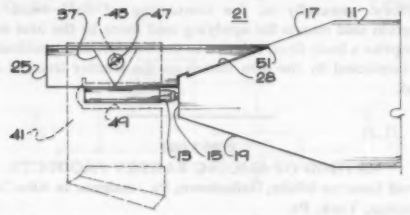
Elof Granberg, 530 Canal St. 1A, San Rafael, Calif. 94901

Continuation of Ser. No. 305,447, Nov. 10, 1972, abandoned. This application Dec. 9, 1974, Ser. No. 531,106
Int. Cl.² B23D *63/16*
U.S. Cl. 76—37 5 Claims

1. An adjustment plate for mounting on a saw chain sharpener having a rotary grinding element, said plate comprising

a holding portion releasably secured to the body of said sharpener, said holding portion having means for laterally adjusting said plate with respect to said sharpener body, and

a planar guide portion fixed to said holding portion and extending generally perpendicularly therefrom beyond the end of said sharpener body, said planar guide portion being disposed substantially perpendicular to the direction of said lateral movement of said plate and closely parallel to said grinding element, the bottom edge of said planar guide portion being spaced slightly above the outer diameter of said grinding element such that, by laterally adjusting said holding portion with respect to said body, the flat guiding surface of said planar guide portion can be adjusted relative to the axis of said grinding element to control the contact of said element with the cutting edge of different types and sizes of saw chain teeth supported on said guiding surface, said holding portion including indicia means for alignment with further indicia means on the body of said sharpener to enable said guide portion of



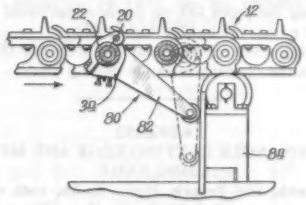
said plate to be adjusted with respect to different diameter grinding elements for sharpening different types and sizes of saw chain cutting teeth said guide portion including a depth gauge attachment detachably secured thereto and extending therefrom, and said holding portion includes further indicia means to enable said holding plate portion to be adjusted with respect to said grinder, whereby, when the depth gauge attachment means is secured to said guide portion the cutter gauge portion of the cutter links of a saw chain may be adjustably ground.

4,002,090

TRACK BUSH TURNING TOOL

Harold W. Vanlandingham, Washington; Roger L. Boggs; David A. Bullock, both of East Peoria, all of Ill., and James N. Maytum, Waverly, Iowa, assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 348,886, April 9, 1973, Pat. No. 3,915,036. This application Sept. 29, 1975, Ser. No. 617,347
Int. Cl.² B25B *13/48*
U.S. Cl. 81—3 R 2 Claims



1. For use with a tractor track including a series of interconnected track links and a plurality of bushings associated with the track links, said bushings being arranged for engagement between teeth of a track driving sprocket, each bushing having a sprocket engaging area which is normally substantially unchanging as the tractor track is operated, apparatus for rotating a bushing to define a new sprocket engaging area thereof with the track in its substantially assembled state comprising: arm means; means associated with the bushing and connected to the arm means so that upon application of force to the arm means about the bushing, rotative force is applied to the bushing through the means associated with the bushing; and means for applying said force to the arm means to rotate said bushing, wherein the means associated with the bushings comprise removable means positionable about the bushing in close proximity thereto, and an insert associated with the

means positionable about the bushing and movable inwardly and outwardly from the bushing, said insert being movable inwardly into the worn area of the bushing with the means positionable about the bushing so positioned, and means for fixing the insert in said inward position, wherein the insert is in sliding relation with the means positionable about the bushing and movable substantially radially of the bushing inwardly and outwardly thereof with the means positionable about the bushing so positioned, wherein the insert defines a surface adapted to contact the surface of the bushing in the worn area thereof, the contacting surface of the insert being shaped to conform generally to the contacting of said worn area, wherein said means for applying said force to the arm means comprise a body fixed relative to the tractor, and positioned to be contacted by the arm means as the tractor track is operated.

4,002,091

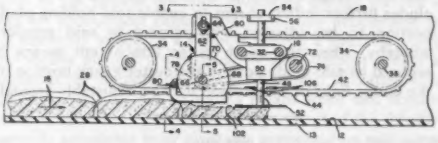
METHOD OF SLICING BAKERY PRODUCTS

David Laverne White, Dallastown, Pa., assignor to Alto Corporation, York, Pa.

Division of Ser. No. 637,891, Nov. 28, 1975. This application Apr. 26, 1976, Ser. No. 679,891

Int. Cl.² B26D *3/08, 3/12*

U.S. Cl. 83—4 **6 Claims**



1. The method of forming a slit extending along a proof line in a cluster of hot dog buns or the like comprising the steps of:

A. Moving a cluster of buns downstream toward and past a cutting blade located on the nominal proof line between two adjacent buns in the cluster;

B. Forcing the side of the bun nearest the nominal proof line to a position further away from the nominal proof line when immediately upstream of the cutting blade to position the proof line between the adjacent buns on the nominal proof line;

C. Holding the proof line on the nominal proof line as the cluster passes the cutting blade; and

D. Forming a slit in the proof line between the adjacent buns as the cluster passes the cutting blade.

4,002,092

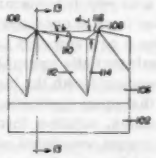
COMPOUND ANGLE CUTTING EDGE AND METHOD OF USING SAME

Billy R. Smith, and Francis Moses Smith, both of Warren, Mich., assignors to B & M Die Co., Inc., Warren, Mich.

Division of Ser. No. 585,802, June 11, 1975, Pat. No. 3,961,858. This application Nov. 7, 1975, Ser. No. 630,067

Int. Cl.² B26F *1/44*

U.S. Cl. 83—55 **3 Claims**



1. In a method of cutting blanks from stock material, the steps of positioning the stock material in alignment with a die rule, relatively moving the die rule and stock material toward one another, initially contacting the stock material by a plurality of generally equally spaced peaks on a cutting portion of the die rule, thereby piercing the stock material at a plurality of generally equally spaced positions, continuing to relatively move the material and the die rule and cutting the stock material between the plurality of pierced positions with a plurality of cutting edges, each of said primary cutting edges (a) extending from one piercing peak substantially the entire distance to the next piercing peak and (b) extending away from the stock material by an angle of from about one to fifteen degrees with a line connecting the piercing peaks said cutting edges thereby progressively cutting the stock material substantially unidirectionally from one pierced position progressively toward a next adjacent pierced position by an amount in comparison with the extent of relative movement between the cutting tool and stock material within the ratios of between about 57.29:1 and 3.73:1.

4,002,093

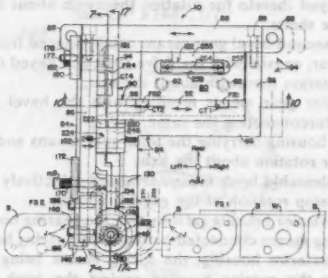
PUNCH PRESS TRANSFER MECHANISM

Harold Heisler, Old Naperville Road, Rte. 3, Plainfield, Ill. 60544

Filed Sept. 19, 1975, Ser. No. 615,056

Int. Cl.² B26D *7/06, 5/22*

U.S. Cl. 83—154 **26 Claims**

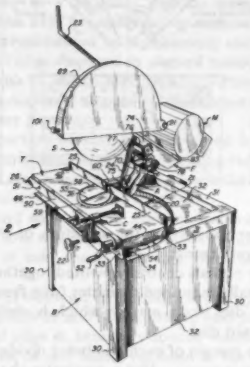


1. The combination with a punch press having a fixed die shoe and a vertically reciprocable punch holder, of a cyclicly-operable transfer mechanism for receiving successive work blanks issuing from a web at a first forming station and delivering the same angularly displaced to a second forming station, said transfer mechanism comprising a guide member fixedly secured to the die shoe, a carriage shiftable laterally on said guide member between said stations, a pair of work-engaging jaws mounted on said carriage for rotation about a vertical axis and including cooperating jaw fingers relatively movable toward and away from each other between blank-gripping and blank-releasing positions, means for releasably locking said jaw fingers in their blank-gripping position, a cam member shiftable laterally in unison with said carriage and slidably secured to the punch holder for vertical movements in unison therewith, means effective between said carriage and jaws for rotating the latter, first cam means effective between the cam guide members for shifting the cam member and consequently the carriage laterally, second cam means effective between the cam member and rotating means for actuating the latter, and third cam means effective between the cam member and jaws for actuating said locking means.

4,002,094
METAL SAW

Harold L. Erickson, Salida, and Wayne S. Weaver, Denver, both of Colo., assignors to Quick Rip Corporation, Littleton, Colo.

Filed Aug. 11, 1975, Ser. No. 603,268
Int. Cl.² B27B 5/20, 5/26
U.S. Cl. 83—471.3 5 Claims



1. A circular saw for cutting elongated, rod-like material square, or at any selected bevel angle, said saw and its mount being carried upon a fixed, bench-like base having a front edge which a workman will normally face when operating the saw and with the saw being disposed above the material to drop downwardly upon the material, and comprising, in combination therewith:

a. an elongated, horizontally-disposed table to receive and hold the rod-like material to be cut by the saw with the longitudinal reach thereof paralleling and being adjacent to the front edge of the base;

b. a swing arm mounted upon a vertical pivot carried on the base beneath the table, the vertical pivot axis thereof projecting through the table at a position where material on the table may be centered with respect to this axis and said arm extending rearwardly and upwardly therefrom to project behind and above the table to carry a horizontally disposed trunion shaft behind and above the table;

c. a tippable frame mounted upon said trunion shaft to extend forwardly therefrom and over and above the table;

d. a horizontal, powered, saw shaft on said frame positioned over the table and substantially at the projection of the vertical axis of the pivot, and with the aforesaid circular saw carried upon the shaft at a point intersecting the said projection of the vertical axis of the pivot whereby the saw is essentially centered at the extension of said vertical pivot axis above the table to permit the saw to drop downwardly and directly upon a piece of material on the table at the said pivot axis with the angle of the cut being selected by swinging the swing arm, and with the saw blade adapted to move a short distance below the table surface as it cuts through the piece of material;

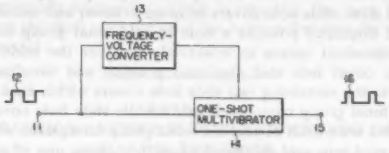
e. a cutout in the table about the vertical axis of the pivot having proportions slightly greater than the span of the portion of the blade moving below the table surface; and

f. a horizontal, circular guide plate upstanding from the swing arm at the pivot axis and extended into the cutout and to the surface of the table with an axial center-slot therein to receive the portion of the blade which moves below the table surface, said saw and guide plate rotating together whenever the swing arm swings.

4,002,095
WAVEFORM CONVERTER FOR USE WITH AN ELECTRONIC MUSICAL INSTRUMENT AND CAPABLE OF CONTROLLING THE DUTY FACTOR OF A RECTANGULAR WAVE TONE SIGNAL

Rokurota Mantani, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Nov. 7, 1975, Ser. No. 629,919
Claims priority, application Japan, Nov. 13, 1974, 49-129855
Int. Cl.² G10H 1/06, 1/02
U.S. Cl. 84—1.01 2 Claims



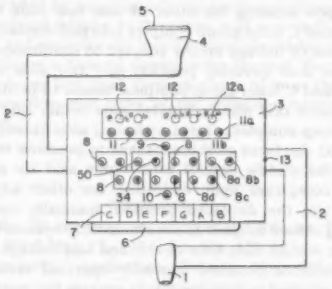
1. A duty factor controlling waveform converter for use with an electronic musical instrument comprising:

an input terminal for receiving an input rectangular wave tone signal; an output terminal; a frequency-voltage converter coupled to said input terminal to receive the input rectangular wave tone signal and produce a control voltage signal whose level corresponds to the frequency of the input rectangular tone signal; a one-shot multivibrator coupled between said input and output terminals to generate at said output terminal an output rectangular wave tone signal having the same frequency as the input rectangular wave tone signal, said one-shot multivibrator including a control terminal coupled to receive the control voltage signal and means responsive to the control voltage signal for determining the duty factor of the output rectangular wave tone signal to be produced by said one-shot multivibrator in accordance with the voltage level of the control voltage signal.

4,002,096
MUSICAL INSTRUMENT

William Mitchell, Toronto, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Jan. 19, 1976, Ser. No. 650,056
Int. Cl.² G10D 7/00
U.S. Cl. 84—380 R 11 Claims



1. A wind musical instrument comprising a hollow tube having a bell shaped termination, a plurality of holes along the length of said tube, first hole covering means manually independently operable by depression of buttons, first number of holes uncoverable upon depression of said buttons, said first hole covering means biased to cover said first number of holes when said buttons are undepressed, said first number of holes capable of producing one octave of musical tones containing seven natural sequential tones and five intermediary half tones, seven second hole covering means each manually inde-

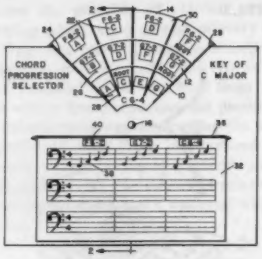
pendently operable by depressing one of seven keys associated therewith, slide hole covers uncoverable by depression of said keys, said second hole covering means biased to cover said slide hole covers when in hole covering position when said keys are undepressed, a second number of holes beneath said slide hole covers, said slide hole covers each selectively manually displaceable into a displaced position uncovering the associated hole in said second number of holes, said slide hole covers individually operated by programming means, said programming means adapted to selectively individually displace into said displaced position said slide hole covers, six of said seven second hole covering means each covering three slide hole covers constituting a tonal group complex, each of said three slide hole covers adapted to cover and uncover into said displaced position a hole in said tonal group complex, independent means to selectively uncover the middle slide hole cover into said displaced position and simultaneously cover the remaining two slide hole covers within each of said six tonal group complexes, said middle slide hole cover associated with each of said six tonal group complexes when uncovered into said displaced position exposes one of said second member of holes adapted to produce one of six successive natural tones within a musical scale, two slide hole covers adjacent said middle slide hole cover within each of said six tonal group complexes uncover two of said second number of holes adapted to produce respectively the half tone below and above said natural tone when two slide hole covers are operated independently of each other in said displaced position, the seventh of said seven second hole covering means covers two slide hole covers constituting the C natural tonal group complex, each of said two slide hole covers in said seventh second hole covering means adapted to cover and uncover into said displaced position a hole in said C tonal group complex, means to cover said two slide hole covers within said C tonal group complex, the length of said tube adapted to produce the C natural tone when all holes in said first number of holes and all holes in said second number of holes are covered, one of said two slide hole covers within said C tonal group complex adapted to produce the half tone below the C natural tone, the other of said two slide hole covers within said C tonal group complex adapted to produce the half tone above said C natural tone, means to selectively cover said middle hole within each of said six tonal group complexes upon uncovering into the displaced position one of said adjacent slide hole covers, means to cover the hole associated wit one of said adjacent slide hole covers a tonal group complex upon locating the other adjacent slide hole cover into said displaced position, means to locate into hole covering position one of the said two slide hole covers within said C tonal group complex upon locating the other of said two slide hole covers within said C tonal group complex into said displaced position, operation of linkage means adapted to simultaneously locate into the hole covering position said two slide hole covers within said C tonal group complex, means to produce the half tone above said middle natural tone within said six natural tone group complexes upon operating an adjacent slide cover into said displaced position, means to produce the half tone below the middle natural tone within said six natural tone group complexes upon operating the other adjacent slide cover into the displaced position, manually operated first ganging means adapted to simultaneously operate three of the said six middle slide hole covers and said linkage means into said displaced position, manually operated second ganging means adapted to simultaneously operate the remaining three of said six middle slide hole covers into said displaced position, said first ganging means adapted to include the C-E-G-B tonal group complexes, said second ganging means adapted to include the D-F-A tonal group complexes, lever means adapted to uncover an octave hole located intermediate the mouthpiece end of said tube and all of said second number of holes, uncovering means for said octave hole producing a tone one octave higher than the tone otherwise produced by uncovering a single hole in said first number of holes or said second number of holes when said octave hole is covered.

4,002,097

CHORD PROGRESSION SELECTOR

Verna M. Leonard, 8701 N. Highway 41, Fresno, Calif. 93727

Filed July 10, 1975, Ser. No. 594,746
Int. Cl.² G09B *15/02*
U.S. Cl. 84—471 SR **2 Claims**



1. An aid for simplifying the selection of chord inversion progressions comprising:

a. a plurality of dials centrally pivoted together and being of incrementally increased diameter from front to rear, such that each dial has a margin which is visible around the next forward dial;

b. the visible margin of each dial being divided into a plurality of sectors representing a particular chord type and its inversions and each of said sectors displaying in order the space scale tone names of the chord or inversion named thereon, said sectors being identical in angular dimension and number for all dials and each of said sectors containing the same number of scale tones; and

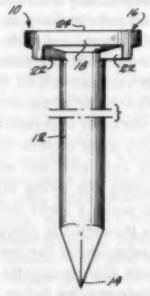
c. each of said dials being composed of a flexible material and having a plurality of radial slits provided in pairs adjacent each of said named scale tones to provide a tab for each scale tone, whereby any selected one of said named scale tones can be removed from view by folding the tab displaying same backward.

4,002,098

NOTCHED HEAD NAIL HAVING A PAIR OF DEPENDING ANNULARLY SPACED RADIAL ABUTMENT RIBS AND PACKAGE THEREOF

Edward A. Colechia, East Greenwich, R.I., assignor to Textron, Inc., Providence, R.I.

Filed May 7, 1975, Ser. No. 575,399
Int. Cl.² F16B *15/02*
U.S. Cl. 85—28 **11 Claims**



1. A nail including a shank provided by a length of metal strand material severed at one end from an end portion of a supply of such material and formed thereon with a workpiece entering configuration,

said shank having an integral enlargement on the opposite

end portion thereof formed in such a way that there is a tendency for a burr to grow upwardly therefrom in a position hereinafter set forth, said enlargement defining a head configured to facilitate collation of said nail with similar nails in a row formation in which the shanks of adjacent nails are in abutting parallel relation and the heads of adjacent nails are in overlapping abutting relation,

said head extending radially outwardly from said shank substantially throughout the entire periphery thereof and terminating in a partially circular peripheral edge of greater than 180° generally arcuate about the axis of said shank interconnected by a concavely curved open-sided peripheral edge disposed in aligned relation at its central portion with an adjacent peripheral portion of said shank, the position of said aligned relation constituting the position of burr growth,

the lower portion of said head bounded by said partially circular peripheral edge and extending radially outwardly from said shank having a pair of annularly spaced abutment elements depending therefrom,

said head and shank being symmetrical with respect to a median plane which passes through the aforesaid aligned portions of said shank and said open-sided peripheral edge,

said abutment elements extending outwardly from the adjacent periphery of said shank toward said partially circular peripheral edge in annularly spaced relation to a peripheral portion of said shank opposed to the aforesaid adjacent peripheral portion in aligned relation with said open-sided peripheral edge and symmetrical relation with said median plane,

said abutment elements defining a pair of annularly spaced downwardly facing abutment surfaces disposed in general alignment,

the upper portion of said head having a top surface including a pair of mating upwardly facing abutment surface areas extending inwardly from said open-sided peripheral edge in spaced relation to the aforesaid central portion thereof disposed in aligned relation with said shank adjacent peripheral portion.

4,002,099

RIVET

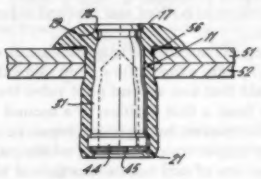
William David Bradley, and Keith Denham, both of Welwyn Garden City, England, assignors to Aerpat A.G., Zug, Switzerland

Filed Aug. 11, 1975, Ser. No. 603,656

Claims priority, application United Kingdom, Aug. 16, 1974, 36253/74

Int. Cl.² F16B *13/10*

U.S. Cl. 85—74 **14 Claims**



1. A blind self-plugging rivet comprising a stem and a tubular shell, said shell having an enlarged head at one end, a tail portion remote from the head and a bore extending completely through the shell, the bore in said tail portion having a step wise reduction in diameter in a direction away from the head; said stem extending through the bore of the tubular shell and having an enlarged head at one end; whereby the stem head can be pulled into the tail end of the bore of the tubular shell in a direction towards the head of the shell to radially expand the shell at least at the tail end thereof to form a blind head, and thereafter the remainder of the stem can be broken off from the stem head to leave the stem head plugging the shell, said shell having first and second engaging means positioned spaced apart along the shell bore, said second engaging means being provided by said step wise reduction in the tail portion; and third and fourth engaging means positioned spaced apart along the stem head; the said second and third engaging means being adapted to be mutually engaged to hold the stem and shell assembled together before pulling of the stem head into the shell as aforesaid, and the said first and third engaging means being adapted to be mutually engaged, and the said second and fourth engaging means being adapted to be mutually engaged, to assist in retaining the stem head plugging the shell after the stem has been pulled into the shell as aforesaid.

4,002,100

EXPANSION ANCHOR SLEEVE AND METHOD OF MAKING THE SAME

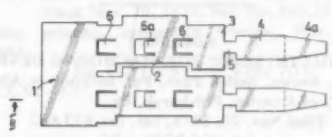
Josef Buchell, Herrliberg, Switzerland, assignor to Tuflex AG, Glattbrugg, Switzerland

Filed May 30, 1975, Ser. No. 582,282

Claims priority, application Switzerland, June 5, 1974, 7708/74

Int. Cl.² F16B *13/06*

U.S. Cl. 85—85 **9 Claims**



1. A metal expansion anchor sleeve, comprising a sheet-metal sleeve body open along a generatrix thereof and having at least two radially outwardly expansible sections separated by a slot extending from one end of the sleeve body, said sleeve body also having a longitudinal passage for insertion of an expander member, and said sleeve body further having tongues integral with one end of the sleeve body and bent back upon the respective sections inwardly of said sleeve and forming a bight-shaped leading end portion which has a radius of curvature equal to at least one-half of the thickness of a respective section, each tongue including a tapered free end portion bounded by two mutually converging surfaces one of which is inclined relative to the other, said one inclined surface facing and engaging the inner surface of said longitudinal passage defining a tapered continuation thereof, the respective tongue being bent back through an arc of more than 180° providing unobstructed entry of the expander member into said passage.

4,002,101

FIREARMS

Paul E. Tellie, 20 rue Bergson, 42000 Saint-Etienne, France

Filed May 17, 1974, Ser. No. 470,853

Claims priority, application France, May 29, 1973, 73.19393

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² F41C *17/02*; **F41D** *11/02*

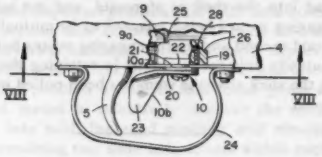
U.S. Cl. 89—142 **7 Claims**

1. An automatic firearm comprising:

a trigger, and

a firing selector positioned adjacent said trigger, said firing selector comprising an inner part cooperating with a mechanism of the firearm and an outer part actuable by a marksman, said outer part being movable, relative to the

vertical plane passing through the longitudinal axis of the firearm, into a central position symmetrical relative to said plane, a right-hand off center position to the right of said plane relative to the front end of the firearm, and a left-hand off-center position to the left of said plane relative to the front end of the firearm, and the central position corresponds to a "safety" position of the firing selector and the two off-center positions correspond to a



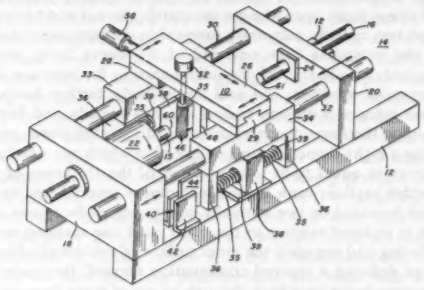
"burst" position and a "shot-by-shot" position of the firing selector, said firing selector being turnable, said inner part comprising a turning part, said outer part comprising a pivoting part connected to said turning part to control its rotation, and said pivoting part being positioned in front of the trigger and mounted pivotally around a pin which is substantially perpendicular to the longitudinal axis of the firearm.

4,002,102

AUTOMATIC SETUP FOR MACHINING DEVICE

Trenton L. Brown, Bethel Park, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Nov. 20, 1975, Ser. No. 633,682
Int. Cl.² B23C 1/06
U.S. Cl. 90—15 R **10 Claims**



1. Apparatus for relatively positioning the cutting edge of a machine tool and the surface of a workpiece to be machined by said tool, the apparatus comprising

means for mounting the workpiece,

a structural member supported for transverse movement with respect to the mounting means and the surface of the workpiece to be machined,

a tool having at least one cutting edge for machining the surface of the workpiece,

means having a surface for locating the surface of the workpiece relative to the cutting edge of said tool in a relationship in which the cutting edge of said tool lies outside of and parallel to the surface of said locating means, said tool and locating means being serially located on said structural member,

means adapted to place the surface of the workpiece to be machined and the surface of said locating means in mutual engagement with each other, and

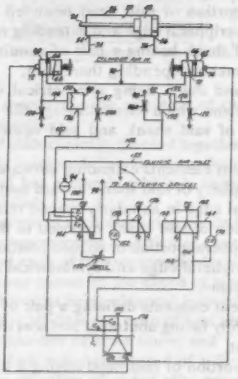
means for moving the structural member relative to and in a direction transverse of the surface to be machined such that the locating means can be moved from the surface to be machined and the machining tool can be moved into cutting engagement with the surface to be machined.

4,002,103

RECIPROCATING APPARATUS WITH A CONTROLLABLE DWELL TIME AT EACH END OF THE STROKE

Frederick W. Martin, Pottstown, Pa., assignor to The West Company, Phoenixville, Pa.

Filed July 1, 1974, Ser. No. 484,699
Int. Cl.² F01L 31/00
U.S. Cl. 91—219 **3 Claims**



1. Apparatus for controlling the reciprocation of a piston in a cylinder chamber having a first port near one end thereof and a second port near the other end thereof, each said port being positioned beyond the cylinder wall portion sealed off by said piston when in its most extreme positions, said apparatus comprising:

first and second pilot valve means each having a cylinder connection, an exhaust connection, a cylinder-air supply connection, and a pilot control connection responsive to a change in fluidic pressure to switch said cylinder connection from communication with said cylinder-air connection to communication with said exhaust connection;

means connecting said cylinder connections of said first and second pilot valve means to said first and second ports respectively;

a source of cylinder-air connected to said cylinder-air supply connections of both of said first and second pilot valve means;

first fluidic means responsive to simultaneous occurrence of substantially zero exhaust flow from said exhaust connections of said first and second pilot valve means to switch its output from a first position to a second position;

second fluidic means having two output connections and two stable output states in one of which states the fluidic pressure at one of said two connections is high compared to that at the other of said two output connections and vice versa in the other of said two states;

means responsive to each occurrence of said second output position of said first fluidic means to reverse the state of said second two-state fluidic means; and

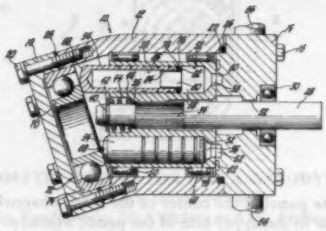
means connecting said output connections of said second two-state fluidic means to respective pilot control connections of said first and second pilot valve means to switch said first and second pilot valve means alternately at times determined by the times of said simultaneous occurrences of substantially zero exhaust flow.

4,002,104

PISTON PUMP OR MOTOR HAVING INTERNAL FLUID FILTER

Morris J. Duer, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed May 5, 1975, Ser. No. 574,599
Int. Cl.² F01B 13/04
U.S. Cl. 91—499 2 Claims



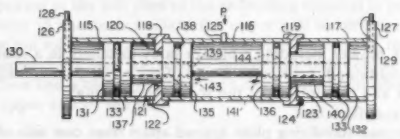
1. A piston pump or motor comprising; a housing, a cylinder block rotatably disposed in said housing including a plurality of axially extending cylinder bores disposed therein; a plurality of pistons each slidably disposed in a respective cylinder bore of said cylinder block and cooperating therewith to form a respective fluid chamber and each piston having an interior opening; a cam disposed in said housing in abutting relation with said pistons to urge said pistons into said cylinder bores to induce fluid flow to and from the fluid chambers upon rotation of said cylinder block; and filter means disposed on each of said pistons for filtering foreign matter from fluid leaking between said pistons and bores into said housing from said fluid chambers including a ring of filter material abutting the piston face adjacent said fluid chamber and being in contact with said cylinder bore, and retaining means disposed in interference fit relation with the interior opening of said piston and having a lip portion securing said ring to said piston.

4,002,105

FLUID ACTUATED GEAR CHANGING SYSTEM

Charles Gilbert Bell, 2220 S. Helen, Sioux City, Iowa 51106, and Michael M. Randolph, 2814 Nebraska St., Sioux City, Iowa 51104

Division of Ser. No. 522,214, Nov. 8, 1974, Pat. No. 3,945,265.
This application July 23, 1975, Ser. No. 598,249
Int. Cl.² F01B 7/10
U.S. Cl. 92—62 4 Claims



1. A fluid actuated cylinder and piston positioning assembly having three positive positions comprising the combination of

a cylinder having end walls;

a shaft;

first and second pistons attached to said shaft and movable therewith;

third and fourth pistons slidably mounted on said shaft between said first and second pistons with said third piston adjacent said first piston and said fourth piston adjacent said second piston;

first stop means attached to and extending into said cylinder between said first and third pistons for limiting axial motion of said first and third pistons;

second stop means attached to and extending into said cylinder between said second and fourth pistons for limiting axial motion of said second and fourth pistons;

means interposed between said third piston and said first piston and movable with said third piston for reaching beyond said first stop means and contacting and moving said first piston;

means interposed between said fourth piston and said second piston and movable with said fourth piston for reaching beyond said second stop means and contacting and moving said second piston;

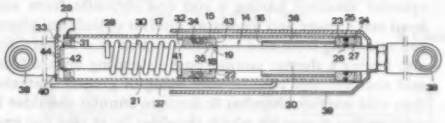
first, second and third means on said cylinder for passing fluid under pressure respectively between said third and fourth pistons and axially beyond the outer limits of motion of said first and second pistons, whereby said assembly assumes three different positively established positions in response to the application of fluid pressure to any one of said first, second and third means with the other two vented.

4,002,106

PISTON-CYLINDER MECHANISM

Torbjorn Edmo, Harnosand, Sweden, assignor to Bispgardens Svets & Smide AB, Bispgarden, Sweden

Filed Mar. 20, 1975, Ser. No. 560,111
Claims priority, application Sweden, Mar. 22, 1974, 7403881
Int. Cl.² F01B 7/10; F16J 1/10
U.S. Cl. 92—65 8 Claims



1. A piston-cylinder mechanism for the pivoting or tilting of a platform of a vehicle mounted goods elevator between a raised resting position and a lowered working position, including:

a. a cylinder,

b. a piston movably mounted in the cylinder,

c. a piston rod slidably movable through the piston, and movable in the cylinder between a bottom position wherein the platform is lowered and a position of maximum extension out of the cylinder wherein the platform is raised,

d. a driving means connecting the piston and piston rod for moving the piston and piston rod together from the bottom position,

e. a stop in the cylinder limiting travel of the piston and determining an intermediate position of the piston rod, the piston rod being movable relative to the piston between the intermediate position and the position of the maximum extension,

f. spring-engaging means carried by the piston rod, and

g. a spring engaging the spring-engaging means and tending to urge the piston rod from the position of maximum extension in a direction toward the bottom position whereby to initiate at all times a lowering of the platform, the length of the spring being no longer than the difference between the piston rod travel and the piston travel so that the spring is operative solely during the movement of the piston rod relative to the piston and tends to move the platform into a position wherein the proper weight of the platform can cause the piston rod to return to the bottom position in which the platform is lowered.

4,002,107

DISPOSABLE FLUID ACTUATOR

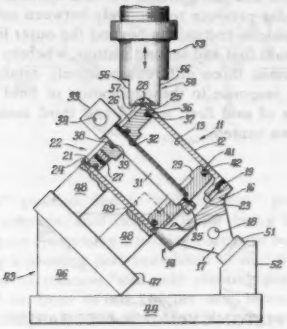
Rodney R. Erickson, Joliet; Melvin H. Peters, Minooka, and Daniel L. McMillan, Morris, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 17, 1973, Ser. No. 425,193

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² F16J *11/02;* **F01B** *29/00*

U.S. Cl. 92—163 **1 Claim**



1. A disposable fluid actuator comprising:

a cylinder member having a cylindrical portion and a head end closure which is an integral element therewith and wherein a head end fluid port extends through said head end closure, said cylinder member also having a head end mounting tang extending from said closure, said tang also being an integral element of said cylinder member, said cylinder member having a rod end opposite from said head end closure and having an interior cylindrical chamber extending from said rod end towards said closure and also having a shorter counterbore extending inward from said rod end, said counterbore being of greater diameter than said interior chamber to form an annular shoulder in conjunction therewith which shoulder faces said rod end,

a circular end cap disposed within said rod end of said cylinder member in coaxial relationship therewith, said end cap having a stepped peripheral surface forming an annular shelf which abuts said shoulder of said cylinder member, said end cap being held therein by a plurality of radially inwardly extending deformed portions of said rod end of said cylinder member, said end cap having a central opening therethrough for a piston rod, said end cap further having a rod end fluid port extending therethrough,

a piston rod extending into said cylinder member through said opening of said end cap, and

a piston disposed coaxially in said chamber for axial movement therewith, said piston being secured to said piston rod,

said end cap and said piston rod and said piston being permanently secured to said cylinder member by said radially inwardly extending portions of said rod end of said cylinder member.

4,002,108

VENTILATED BACK-SEAT REST PARTICULARLY FOR AUTOMOTIVE VEHICLES

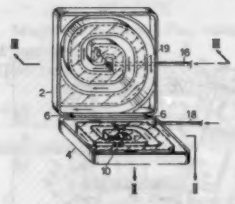
Mordeki Drori, 89 Zahal St., Kiron, Israel

Continuation of Ser. No. 498,634, Aug. 19, 1974, abandoned. This application Aug. 27, 1975, Ser. No. 608,309

Int. Cl.² A47C *7/74;* **B60H** *1/00*

U.S. Cl. 98—2.03 **3 Claims**

1. A body supporting device for use as a chair back rest or seat rest, comprising: a panel of molded plastic material formed with a spirally-extending corrugation defining a spiral channel open at the upper face of the panel and a spiral channel open at the under face of the panel; and an air conduit extending along the under face of the panel from the outer periphery of its spiral channel to the center thereof; one end of the conduit being connected to a source of air, and the opposite end of the conduit being connected to an opening passing



through the panel at the center of the spiral channels to conduct the air to the upper face of the panel; whereby, when the device is occupied by an occupier contacting the center of the upper face of the panel, the center of the open spiral channel at the upper face of the panel is covered by the occupier and the air is directed along the upper face spiral channel in direct contact with the occupier and escapes from the channel at the outer edges of the panel where not contacted by the occupier.

4,002,109

BLOWER

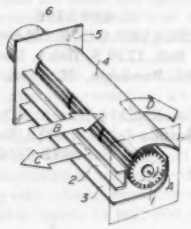
Michimasa Hori, Yao, and Takeshi Aizawa, Ikoma, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 427,733, Dec. 26, 1973, Pat. No. 3,940,215. This application May 30, 1975, Ser. No. 582,293

Claims priority, application Japan, May 14, 1973, 48-53431; Dec. 28, 1973, 49-3330; Oct. 18, 1973, 48-117591

Int. Cl.² B23B *39/00;* **F24F** *13/00*

U.S. Cl. 98—32 **10 Claims**



1. A blower including a blower body installed, in a room to be conditioned, near or on a wall of the room partitioning the inside and the outside of the room, comprising:

a cross flow fan;

a vortex stabilizing plate spaced apart from one side of the outer periphery of said cross flow fan;

a back guider, located in a position opposite the position of said vortex stabilizing plate, with said cross flow fan located between said vortex stabilizing plate and said back guider, said back guider being in the form of a curved surface which parts progressively from the outer periphery of said cross flow fan in the rotating direction of said fan;

a flow dividing guider, disposed on a suction side of said cross flow fan and parting progressively from the outer periphery of said cross flow fan in the rotating direction of said cross flow fan; and air suction space being formed between said flow dividing guider and said vortex stabilizing plate, a first branching air delivery space being formed between said flow dividing guider and said back

guider, and a second air delivery space being formed between said vortex stabilizing plate and said back guider, said flow dividing guider including means for enabling air to flow from said air suction space in two substantially opposite directions to said first air delivery space and said second air delivery space, and

an air passageway, communicating with said first branching air delivery space, formed in the wall for establishing a communication between the inside and the outside of the room.

4,002,110

AUTOMATIC OBTURATOR FOR A GASODYNAMIC VENTILATION DEVICE

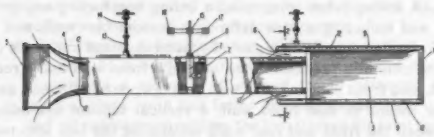
Constantin Teodorescu; Ilie Chiriac, and Ion Stelian Iacob, all of Bucharest, Romania, assignors to Institutal Pentru Creatie Stintifica si Tehnica, Bucharest, Romania

Division of Ser. No. 455,338, March 27, 1974, abandoned. This application May 6, 1975, Ser. No. 574,927

Claims priority, application Romania, Apr. 2, 1973, 74347

Int. Cl.² F24F *13/10*

U.S. Cl. 98—43 R **3 Claims**



1. A gasodynamic ventilation device consisting of a primary ejection channel, an injection nozzle within the primary ejection channel and facing downstream, a secondary ejection channel mounted coaxially of the primary ejection channel and connected to the downstream end of the primary ejection channel by vanes so that the two channels are separated by the section which constitutes an inlet for the admission of secondary air, the primary ejection channel being provided at its upstream end with an admission inlet for the ambient air, and the downstream end of the secondary ejection channel being provided with an exit port having upper and lower edges, an automatic obturator disposed at the exit port of the secondary channel, the obturator having the shape of a flap and having a bore extending therethrough intermediate its ends, a pivot pin supported at the exit port of the secondary channel in parallel relation to and intermediate the upper and lower edges, the pivot pin extending through the intermediate bore of the flap to support the flap for pivotal movement between an open position and a closed position, and a counterweight affixed to the upper end of the flap.

4,002,111

CONTINUOUS-FLOW WINE-MAKING APPARATUS

Andre Joseph Pujol, 11120 Argeliers, France

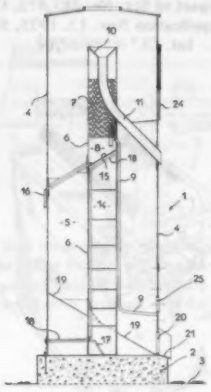
Filed Nov. 24, 1975, Ser. No. 634,737

Claims priority, application France, Dec. 12, 1974, 74.40945

Int. Cl.² C12B *1/10*

U.S. Cl. 99—276 **10 Claims**

1. Continuous-flow wine-making apparatus comprising two coaxial towers, the central of said towers being divided by an intermediary inclined bottom into an upper wine room along which extend annular filtering grids and a lower room which is



entirely filled with a thermal regulation fluid, especially cooling water, hot water or heating steam.

4,002,112

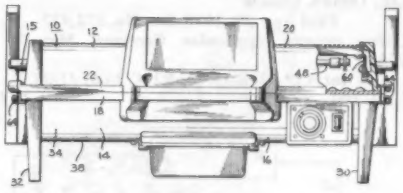
COOKING APPLIANCE WITH REMOVABLE COOKING GRIDS

Paul V. Snyder, Whitehall, Pa., assignor to General Electric Company, Bridgeport, Conn.

Filed July 21, 1975, Ser. No. 597,835

Int. Cl.² A47J *37/06*

U.S. Cl. 99—376 **8 Claims**



1. An electric cooking appliance comprising:

a. a housing including side walls and a generally horizontal wall;

b. electric heating means positioned within said housing;

c. a cooking grid being shaped to be removably positioned on said housing;

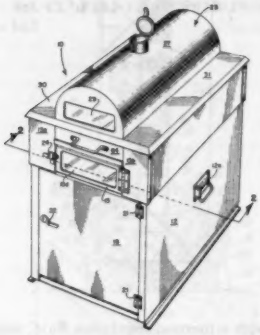
d. keeper means having a slot provided at the side of said grid, said keeper means including a raised retaining portion and a lower seating portion facing into said slot, and said slot including a generally vertical open portion located adjacent to said raised retaining portion; and

e. a latch having two legs, one of the legs extending generally inwardly within the housing toward the horizontal wall and along the inside of one of the side walls, the end portion of said inwardly extending leg being movably connected to said side wall, the other leg of said latch extending outwardly over said side wall so that said cooking grid may be positioned on said housing with the outwardly extending leg of said latch being located within the open portion of said slot and the cooking grid may be held on the cooking appliance by moving the latch over the raised portion of the keeper and onto the lower seating portion of the keeper wherein the latch and the keeper hold the grid on the cooking appliance.

4,002,113
COOKING APPARATUS

Jack S. McLane, 1853-B Vintage Court, Marietta, Ga. 30060

Continuation-in-part of Ser. No. 187,972, Oct. 12, 1971, abandoned. This application Nov. 13, 1975, Ser. No. 631,716
Int. Cl.² A47J 37/04
U.S. Cl. 99—447 5 Claims

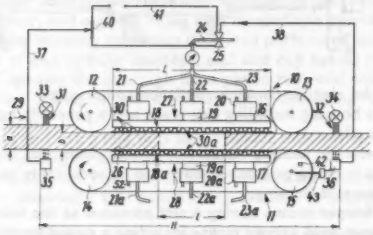


1. A grill type cooking apparatus comprising a housing, a source of heat at a lower portion of said housing, a grill cooking surface located above said source of heat, an open container positioned beneath said grill cooking surface for holding flavoring means or the like, and means in said housing for directing heated air from said source of heat first in upward directions from said source of heat and then in lateral directions over said container and then in upward directions through said grill.

4,002,114
HYDRAULIC DUAL-BELT PRESS AND CONTROL

Manfred Guttinger, Leinfelden, Germany, assignor to Sandco Ltd., Ottawa, Canada

Filed Apr. 29, 1975, Ser. No. 572,937
Claims priority, application Germany, May 7, 1974, 2421955
Int. Cl.² B30B 15/16; B29C 3/06, 15/00
U.S. Cl. 100—49 10 Claims

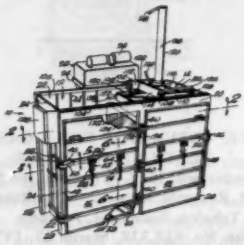


1. In a dual-belt press for exerting controlled pressure upon a continuous strip of material passing through a treatment zone, control means which includes sensing means which senses the flow of the strip of material toward said treatment zone and pressure-control means to control the pressure exerted by the press and which responds to an interruption in said flow of material when sensed by said sensing means to reduce said pressure exerted by the press, said control means including means to restore said pressure exerted by the press to a predetermined value upon the resumption of said flow of material as sensed by said sensing means and including means to prevent said restoring of said pressure until a continuous strip of material has moved toward the press passed said sensing means having a length sufficient to extend from said sensing means through said treatment zone.

4,002,115
DOUBLE BALING PRESS

Maurice Nanoia, 1761-NW. 108th Ave., Pembroke Pines, Fla. 33026

Filed Feb. 6, 1975, Ser. No. 547,563
Int. Cl.² B30B 15/16
U.S. Cl. 100—53 5 Claims

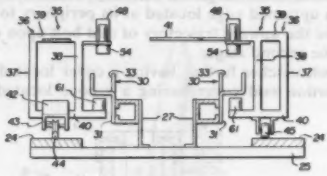


1. A baling press comprising a baling box having an open top and including a base defining a bottom box wall, and a main frame comprising a pair of spaced opposed end walls of a first common predetermined height, a front wall and a rear wall, said front wall and rear wall having upper end zones, and door means in said front wall; a vertical septum extending between the front and rear walls separating the box into two like side-by-side baling chambers, said septum extending upwardly above said bottom wall a distance less than said predetermined height of said end walls, said main frame including track means on the upper end zones of the front and rear walls and above said septum and extending across the septum, and a trolley carriage means including roller means in mating engagement with said track means for reciprocable movement along said track means across the top of said septum from a first position above one of the chambers to a second position above the other of said chambers, power actuated platen means operably supported by said trolley carriage for selective bi-directional vertical movement within either of said two side-by-side baling chambers; a first electrical interlock means to render said power actuated platen means inoperable except when said platen is vertically aligned with either of said side-by-side baling chambers, a second vertical interlock means to render said power actuated platen means inoperable if said door means are not closed, said door means comprising a main portion of said front wall, providing access means to the respective baling chambers for removal of compacted bales therefrom; and means normally suspending said power actuated platen means in the top portion of said baling box and means to actuate said platen means including a vertically disposed ram means centrally disposed atop said trolley carriage; and said first electrical interlock means comprises, a switch actuating plate pivotally attached to the outside face of said back wall for vertical alignment with said septum and being spaced thereabove in the path of travel of said carriage, and an inwardly extending horizontal lip portion on said switch actuating plate, extending through said back wall into the path of travel of said platen along said track means and a first electric switch means on the box including a portion operably engaged by said switch actuating plate and including biasing means normally urging said switch means into an "off" position and movable to a second current "on" position when said lip is moved outwardly by said platen.

4,002,116
APPARATUS FOR FORMING TRUSSES

James Knowles, Bloomfield Hills, Mich., assignor to Jack N. Schmitt, Birmingham, Mich.

Filed May 9, 1975, Ser. No. 576,031
Int. Cl.² B30B *1/32*
U.S. Cl. 100—100 8 Claims



1. Apparatus for forming truss-like joists made of a pair of parallel, elongated chords with flat, sheet metal webs overlapping and extending between the chords and secured thereto at the overlapped portions by struck-out teeth, comprising:

a support surface and a pair of parallel rails mounted above the support surface;

a number of upwardly opening U-shaped supports secured to said rails for receiving wooden chords and positioning them above and to the sides of said rails, whereby metal webs may be laid upon said rails so that their ends extend generally transversely of the rails and beneath chords supported within such U-shaped supports;

a pair of presses supported upon said support surface, each adjacent to one of said rails, with each of said presses comprising a generally C-shaped frame arranged in a vertical plane, with one frame opening towards the other and means interconnecting the two frames for joint movement;

guide means formed on said support surface and cooperating guide elements formed on one of said frames for guiding said frame in parallelism along the length of the rails;

a pressure clamp means mounted upon a horizontal leg of each of said frames and an opposing platen mounted upon another leg of said frames in alignment with the clamp means, with said clamp means arranged to overlap its adjacent chord;

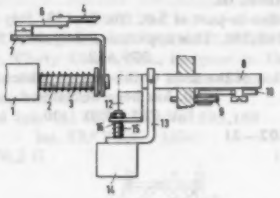
wherein webs may be arranged on said rail below said chords and corresponding webs may be arranged upon the upper surfaces of said chords in alignment with the first mentioned webs and said clamp means may be each aligned with a pair of opposed tooth portions formed on said webs so that actuation of said clamp means squeeze the webs towards the chords for embedding their teeth therein.

4,002,117
ROTARY COPYING MACHINE

Gerhard Ritzerfeld, Schorlemer Allee 14, 1000 Berlin 33, Germany

Filed Aug. 1, 1975, Ser. No. 601,165
Claims priority, application Germany, Aug. 2, 1974, 2437817
Int. Cl.² B41L *47/46*
U.S. Cl. 101—91 7 Claims

1. A rotary copying machine comprising a rotatable printing drum carrying a printing form; a back pressure roller movable toward and away from the printing drum; means for feeding sheets to be printed between said printing drum and said back pressure roller; adjustable means for cyclically moving said back pressure roller during each revolution of said printing drum for selectively printing either a full page or a section of a full page of the printing form on the sheet; means for feeding a moistening liquid onto the sheets while they are fed between the drum and the roller and comprising a pump with a reciprocating piston; adjustable stop means; and locating means operatively connected to said adjustable means for locating

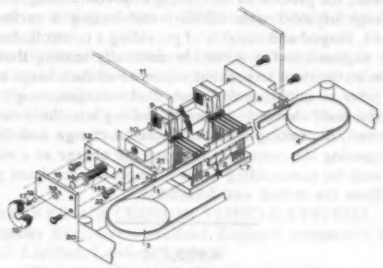


said adjustable stop means in the path of said piston to limit the stroke of the latter during printing of a section of a full page and for locating said adjustable stop means out of the path of said piston during printing of a full page.

4,002,118
PRINTER MECHANISM FOR ADJUSTING THE POSITION OF HAMMERS

Osamu Washimine, Sayama, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Sept. 23, 1975, Ser. No. 616,134
Claims priority, application Japan, Sept. 27, 1974, 49-111089
Int. Cl.² B41J *1/20*
U.S. Cl. 101—93.14 2 Claims



1. A hammer type printer mechanism comprising:

a belt having a multiplicity of embossed type characters thereon;

a driving pulley and driven pulley around which the belt is looped to carry the characters along a printing line;

a plurality of printing hammers for impacting with the type characters to print the characters on a recording medium;

leaf springs for supporting said printing hammers;

electromagnetic actuating means for striking said printing hammers to cause said printing hammers to impact against said recording medium;

support means for mounting said leaf springs in said printer;

means for shifting said support means in a direction parallel with the printing line, wherein said shifting means includes:

a guide member for supporting slidably said support means;

a threaded member journaled in said guide member and threaded in said support means so as to shift said support means when rotated, and

a dial attached to said threaded member and exposed on one side of said guide member for manual manipulation.

4,002,119

METHOD FOR IN SITU ASSEMBLY OF CHARGE FOR CONTROLLED SHOOTING OF WELLS

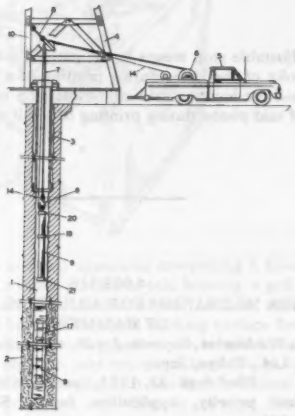
Henry H. Halley, Jr., Alton, Ill., assignor to Drogen Incorporated, Alton, Ill.

Continuation-in-part of Ser. No. 56,438, July 20, 1970, Pat. No. 3,763,781. This application July 16, 1973, Ser. No. 379,642

The portion of the term of this patent subsequent to Oct. 9, 1990, has been disclaimed.

Int. Cl.[2] F42D *1/00*

U.S. Cl. 102—21 **5 Claims**



1. In the method for in situ assembly of charge for controlled shooting of wells which are at least partially occupied by water, the process of increasing flow comprising, providing a charge of solid state alkali metal having a surface area formed, shaped and capable of providing a controlled reaction when exposed to the water, hermetically sealing the charge within a container to prevent exposure of the charge to moisture prior to initiating the controlled reaction, weighting the containerized charge to insure its sinking into the water occupied well, depositing the containerized charge into the well, and opening the container to react the charge at a sustained rate with the surrounding water to improve petroleum production from the drilled well formation.

4,002,120

MISSILE STAGE COUPLER

Frank Swales, deceased, late of Saratoga, Calif.; by Doris Swales, heir, Sunnyvale, Calif.; by Sally M. Swales, heir, Mountain View, Calif., and by Pamela J. Lettis, heir, Cupertino, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 31, 1975, Ser. No. 600,662

Int. Cl.[2] F42B *15/10*

U.S. Cl. 102—49.5 **6 Claims**

1. A separation system comprising:

a. a first missile stage;

b. a second missile stage;

c. means for joining and separating said first and second missile stages;

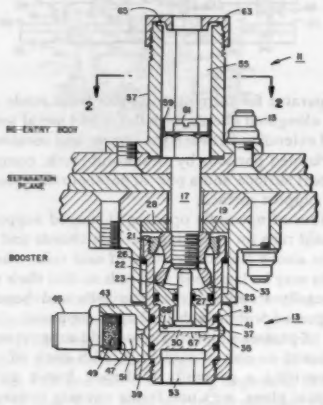
d. said means including a bolt, at least one catcher for securing one portion of said bolt to said first missile stage, at least one securing means for joining another portion of said bolt to said second missile stage, and ejection means for propelling said bolt from said second missile stage into contact with said first missile stage;

e. said bolt having a head portion, a bottom portion and a shaft therebetween, the cross-section of said shaft being of lesser dimension than that of the head portion;

f. each catcher being a bolt catcher having a top portion, a bottom portion and a body therebetween, said bottom portion having a hole therein, said hole being of cross-section at least equal to the cross-section of said shaft and less than at least one cross-section dimension of said bolt head portion;

g. said bolt further having a flat guide located at the top of said bolt head portion having a size and shape identical to the interior cross-section of the body of said bolt catcher and an upturned edge located at its periphery to further stabilize the upward trajectory of said bolt upon ejection from the second stage;

h. said bolt catcher further having a cover located at said top portion said cover having a groove located at the



interior junction of said cover and the body of said bolt catcher to accommodate the upturned edge of said guide upon ejection of said bolt from the second stage;

i. the head of said bolt contained within said bolt catcher, the shaft passing through the hole in said bolt catcher and the bottom portion of said bolt joined to said securing means to join said missile stages together;

said ejection means comprising at least one ejector, each of which is simultaneously activated by an electrical signal; whereby

k. upon ejection from said second missile stage the energy of said propelling bolt is transferred to said first missile stage through the body of said bolt catcher, providing a separation thrust to said first missile stage to separate it from said second missile stage.

4,002,121

INCENDIARY PAYLOAD FOR A HEAVY-DUTY BALLISTIC PROJECTILE

Jüergen Prochnow, and Alfred Johannes, both of Duesseldorf, Germany, assignors to Rheinmetall G.m.b.H., Duesseldorf, Germany

Filed Aug. 1, 1975, Ser. No. 600,965

Claims priority, application Germany, Aug. 3, 1974, 2437535

Int. Cl.[2] F42B *13/14*

U.S. Cl. 102—66 **6 Claims**

1. In an elongated, heavy-duty ballistic projectile wherein a detonation-charge containing nose portion of the projectile communicates axially with a tail section thereof through a central ignition channel, and wherein an ejectable payload comprising incendiary material is disposed along and arranged coaxially around the central ignition channel and is disposed before detonation within a plurality of hollow annular elongated containers, the containers being successively disposed in abutting relation between the nose portion of the projectile and an end plate situated in the tail of the projectile behind the

rear-most container, the inner boundary of each container including at least one aperture extending radially therethrough for providing communication between the interior of the ignition channel and the incendiary material within the associated container to effect ignition of the incendiary material upon detonation of the charge, the improvement wherein the end plate in the tail section is removably supported within the tail section and is adapted to be blown free of the projectile by gas pressure generated during detonation of the charge

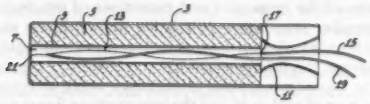
and conducted to the end plate through the ignition channel; and wherein the containers are each formed from a material capable of withstanding the gas pressure generated during detonation of the charge so that the containers remain intact as a self-supporting column after the incendiary material therein is ignited, whereby the intact containers with the ignited incendiary charge disposed therein are ejected rearwardly in a sequential manner out of the projectile when the end plate is blown clear of the projectile.

4,002,122

MICROJET FUSE

Bert B. Gould, Berkeley, Calif., assignor to MB Associates, San Ramon, Calif.

Filed Mar. 2, 1961, Ser. No. 92,963
Int. Cl.² F42C *19/12*
U.S. Cl. 102—70.2 A **4 Claims**



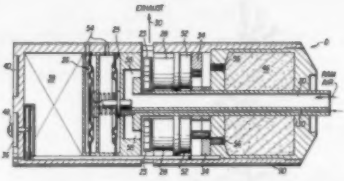
1. An igniter for a miniature solid propellant rocket containing a propellant grain and a nozzle comprising in combination
   a. a solid propellant grain having a central burning perforation extending substantially the length thereof;
   a_1. a housing enclosing the grain in which the housing is closed at the front end and open at the rear end
   b. a pyrotechnic coating on substantially the entire surface of said propellant grain;
   c. an electrical ignition wire extending substantially the length of the perforation of said propellant grain, said ignition wire being comprised of first and second sections, said first section being bare resistance wire and said second section being an insulated return wire connected to the bare resistance wire at its front end located in the forward end portion of the perforation; and
   d. means for supplying current through said insulated wire and said resistance wire whereby the forward end portion of the resistance wire heats up at least as rapidly as the remainder to ignite the pyrotechnic material at the forward end portion of the perforation as soon as the remainder whereby the flame upon ignition of the pyrotechnic material is confined for flow rearwardly through the perforation substantially instantaneously to ignite the propellant grain throughout its length.

4,002,123

DUAL CHANNEL REDUNDANT FUZE

Evan D. Fisher, Chevy Chase, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 11, 1975, Ser. No. 595,189
Int. Cl.² F42C *11/04*
U.S. Cl. 102—70.2 G **18 Claims**



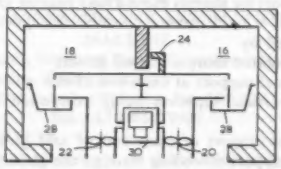
1. A dual channel redundant fuze for aircraft-carried bombs, which comprises:
   a fuze housing containing a pair of substantially identical actuation channels, each of which comprises:
   ram air actuated means for generating electrical energy;
   governor means coupled to said ram air actuated means for regulating gear box means;
   rotor means coupled to said gear box means for rotating a detonator from a safe position to an armed position; and
   booster means explosively responsive to the actuation of said detonator means only when the latter is in said armed position;
   said fuze further comprising:
   ram air receiving means positioned remotely from said housing; and
   barometric sensing switch means positioned within said housing and responsive to ram air and ambient pressure for preventing electrical energy from being coupled out from said ram air actuated means until said fuzed bomb has fallen a predeterminable distance from said aircraft.

4,002,124

TRACKED AIR CUSHION VEHICLE SYSTEMS

Denys Stanley Bliss, Great Shelford, England, assignor to Bliss Pendair Limited, London, England

Filed Aug. 21, 1975, Ser. No. 606,357
Claims priority, application United Kingdom, Sept. 2, 1974, 38189/74
Int. Cl.² B61B *13/08*
U.S. Cl. 104—23 FS **8 Claims**



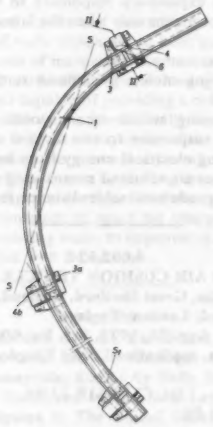
1. A tracked air cushion vehicle system comprising an inverted channel section track, a vehicle platform received within the track, a vehicle body connected to the lift platform, the body and the platform being capable of conjoint vertical and rolling movements relative to the track, bogies at each end of the platform for guiding the latter in longitudinal move-

ment relative to the track and cooperating therewith to enclose a chamber between the lift platform and the track, means for maintaining a subatmospheric pressure within said chamber, means dividing said chamber longitudinally into two separate sub-chambers, said chamber dividing means including sealing means cooperating with said track, and means responsive to any lateral force exerted on the body, except for lateral forces due to centrifugal action, to cause a differential pressure between the two sub-chambers for causing a rolling moment to be applied to said lift platform which is substantially equal and opposite to the rolling moment resulting from the lateral force exerted on the body.

4,002,125
MONORAIL SUPPORT

Johannes Gerhard Spoler, Hagen, Germany, assignor to DEMAG, A.G., Duisburg, Germany

Filed Sept. 29, 1975, Ser. No. 617,722
Claims priority, application Germany, Oct. 1, 1974, 2446770
Int. Cl.² E01B 25/24; B61B 12/04
U.S. Cl. 104—124 15 Claims



1. A support for sharply curved load bearing girders forming a portion of a track for an elevated transportation system, characterized by

a. an elongated sharply curved girder;

b. a vertical support at each end of said girder;

c. said vertical supports being positioned adjacent said girder;

d. a cross-support at each end of said girder, each said cross-support extending through the girder end and having one end thereof supported on its respective vertical support;

e. the opposite end of said cross-support forming one side of a pivot bearing;

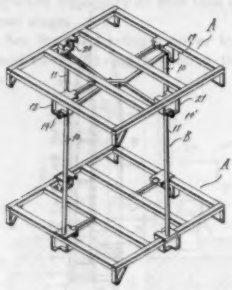
f. a crossbeam connected to each said vertical support and extending across its respective girder end; and

g. one end of each said crossbeam forming the other side of said pivot bearing.

4,002,126
PALLET CONSTRUCTION

Ferris Andrew Bell, St. Louis County, Mo., and Thomas N. DePew, 10 Sunningdale, St. Louis County, Mo. 63124, assignors to said Thomas N. DePew, by said Ferris Andrew Bell, St. Louis, Mo.

Filed Nov. 11, 1974, Ser. No. 522,575
Int. Cl.² B65D 19/40
U.S. Cl. 108—53.5 8 Claims



1. The combination with a pallet for storage and transportation purposes comprising means defining a load supporting deck having four sides, a support member affixed to each side of said deck intermediately thereof and depending therefrom, each support member having a bottom edge comprising upper and lower horizontal linear portions there being an intermediate linear portion interconnecting said upper and lower linear portions, of a tiering frame comprising a plurality of substantially vertical posts corresponding in number to said pallet support members, means detachably engaging the lower ends of said posts upon said pallets immediately above a respective support member, a substantially horizontal top member having legs each of which is fixed proximate its outer end upon a post, each leg having an extension projecting beyond the related post, the upper linear portion of each support member being of greater length than the horizontal cross section of the leg extensions of said top member whereby upon disposition of a pallet upon a tiering frame top member the support members of such overlying pallet will be received upon the upper surfaces of the respective end extensions of the tiering frame top member therebelow permitting limited linear shiftability of such pallet without loss of engagement with said leg end extensions, the intermediate linear portions of support members on two adjacent sides of said deck being directed toward one corner of said deck and the intermediate linear portions of the other two support members being directed toward the corner of said deck diagonally opposite said one corner whereby said intermediate portions of said support members cooperate with the accepted tiering frame and extensions to stabilize the supported pallet against displacement.

4,002,127
CYCLONE STRUCTURE

Derek Angus, 727 Galloway Crescent, London, Ontario, Canada

Filed Mar. 13, 1975, Ser. No. 558,095
Int. Cl.² F23G 5/12; F23D 1/02
U.S. Cl. 110—8 C 15 Claims

1. An incinerator for burning waste products and the like, the incinerator comprising:

a combustion chamber having a side wall disposed concentrically about a longitudinal axis and having first and second transverse end walls attached to respective ends of the side wall;

a discharge tube mounted in the first end wall concentrically about said axis;

first and second inlets adjacent the respective end walls, the inlets being adapted to create two distinct vortical flows in the combustion chambers, the flows moving in the same direction about the axis;

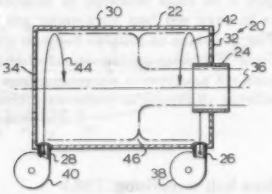
means coupled to the first inlet and adapted to move said waste products and primary air through the first inlet and into the combustion chamber thereby creating a first generally vortical fluid path which progresses axially towards the second end wall;

means coupled to the second inlet and adapted to move secondary fuel and secondary air through the second inlet and into the combustion chamber thereby creating a second generally vortical fluid path which progresses axially towards the first end wall of the combustion chamber;

ignition means adapted to ignite the secondary fuel to cause combustion adjacent the second end wall; and

said fluid paths meeting intermediate the end walls to create an inward radial flow path where the major portion of the combustion of the waste products takes place, the products of combustion then moving axially within the first fluid path before leaving the combustion chamber through the discharge tube, and the waste products and primary air being heated as they move towards the radial flow path by the products of combustion leaving the radial flow path.

12. A method of burning waste products and the like, comprising the steps of:



providing a combustion chamber having a side wall which is substantially symmetrical about an axis, end walls attached to respective ends of the side wall, a discharge outlet in one of said end walls substantially concentrically about the axis, and first and second inlets adjacent respective said end walls for creating two distinct converging vortical flows in the chamber;

directing waste products and primary air through said first inlet and into said combustion chamber in a first generally vortical flow path which progresses axially toward the second end wall;

directing secondary fuel and secondary air through said second inlet into said second combustion chamber in a second vortical flow path which progresses axially toward the first end wall of the combustion chamber and which flow path moves about the axis in the same direction as said first flow path;

igniting said secondary fuel to cause combustion adjacent said second end wall;

permitting the flow paths to meet intermediate the end walls thereby creating an inward radial flow path where the major portion of the combustion of the waste products takes place, the products of combustion then moving axially within the first fluid path before leaving the combustion chamber through said discharge outlet, and the waste products and primary air being heated as they move towards the radial flow path by the products of combustion leaving the radial flow path.

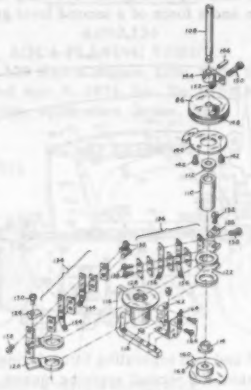
4,002,128
AUTOMATIC SEWING MACHINE

Florian F. Yanikoski, Braintree, Mass., assignor to Union Special Corporation, Chicago, Ill.

Division of Ser. No. 496,749, Aug. 12, 1974, Pat. No. 3,970,016. This application Dec. 16, 1974, Ser. No. 532,986 The portion of the term of this patent subsequent to July 20, 1993, has been disclaimed.

Int. Cl.² D05B *19/00*

U.S. Cl. 112—121.11 **12 Claims**



1. An automatic sewing machine comprising

a sewing needle,

a work holder for holding in place a material to be sewn, the work holder being movable with respect to the needle,

first driving means to move the work holder in a first coordinate direction,

second driving means to move the work holder in a second coordinate direction,

a homing assembly for positioning said work holder at a predetermined home position in said first coordinate direction, said homing assembly being driven in positional synchronism with movement of the work holder in the first coordinate direction,

said homing assembly comprising

an adjustable position indicating means, said position indicating means being connected to and driven by one of said driving means, and

a position reading means providing an output signal in response to the position indicating means, adjustment of said indicating means causing a change in said home position.

4,002,129
CLAMPING APPARATUS FOR AUTOMATIC SEWING MACHINE

Gerald A. Kraatz, Highland Park, Ill., assignor to Union Special Corporation, Chicago, Ill.

Filed July 3, 1975, Ser. No. 592,833

Int. Cl.² D05C *9/04*

U.S. Cl. 112—121.15 **30 Claims**

1. Clamping apparatus for an automatic sewing machine having a sewing needle, comprising:

frame means;

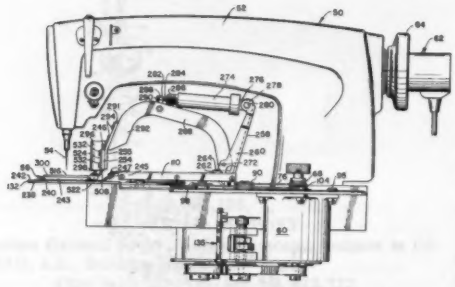
first clamp means being movable with said frame means toward and away from a work surface of the machine for retaining a first work piece;

second clamp means secured at a fixed position on said frame means for retaining a second work piece adjacent the first work piece;

means for movably mounting the first clamp means for relative movement toward and away from the second clamp means, with the first clamp means being located intermediate the second clamp means and the work surface;

first means for applying a separating force against said first clamp means to separate said first and second clamp means;

second means for selectively applying a variable force against the frame means in a direction urging the second clamp means toward the first clamp means, the second applying means separately applying a force of a first level less than said separating force during a first mode of operation and a force of a second level greater than said



first level and said separating force during a second mode of operation, the second applying means moving the first clamp means toward the work surface with the first and second clamp means being located in a first separated relative position during said first mode of operation, and the second applying means overcoming the separating force of the first applying means during the second mode of operation to move the second clamp means toward the first clamp means from said first position to a second relative clamping position for retaining the first and second work pieces together; and

means for moving said frame means and clamp means relative said needle to perform a sewing operation on said work pieces during said second mode of operation.

4,002,130

AUTOMATIC BOBBIN REWINDING FOR SEWING MACHINES

Herman Rovin, Norwalk; Theodore Opuszenski, Darien; Joseph Pellicano, Greenwich, and Alan F. Swenson, Norwalk, all of Conn., assignors to Automatech Industries, Inc., Bridgeport, Conn.

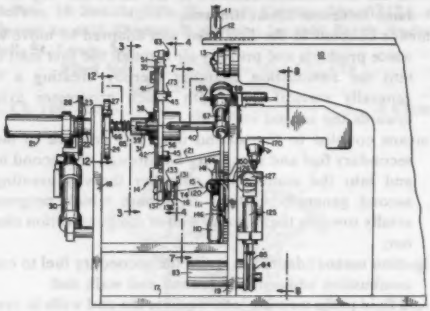
Filed Sept. 22, 1975, Ser. No. 615,428
Int. Cl.² D05B *57/26*
U.S. Cl. 112—180 **16 Claims**

1. In a two-station bobbin replenishing system for use with an industrial type lock stitch sewing machine and including a transfer member mounted for axial motion, for bobbin pickup and deposit, and for rotational movement, for effecting bobbin exchange, an improved means for carrying a bobbin and bobbin case characterized by

a. means on the transfer member for controllably engaging and retaining a bobbin case,

b. said bobbin case having an open end for receiving and discharging bobbins and having an opening in its closed end exposing a portion of the bobbin end wall, and

c. a magnetic element carried by said transfer member and projecting through said opening into close proximity to



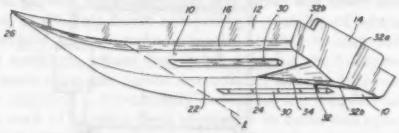
said bobbin end wall to releasably retain said bobbin in its bobbin case.

4,002,131

BOAT HULL CONSTRUCTION

Lee R. Mangrum, Rte. 1, Box 98, Lincoln, Tex. 78948

Filed Apr. 16, 1976, Ser. No. 677,518
Int. Cl.² B63B *1/04*
U.S. Cl. 114—56 **15 Claims**



1. A boat hull comprising:

a bottom including first and second laterally opposite wings, the lower surfaces of said wings tapering downwardly and laterally inwardly from respective side edges thereof and converging in a shallow first peak extending partially along the longitudinal centerline of said bottom, said first peak having a rear end disposed forwardly of the stern edge of said bottom;

first and second sides disposed adjacent respective ones of the side edges of said bottom and extending generally upwardly;

first and second chine portions joining respective ones of said sides to the adjacent side edge of said bottom, said chine portions having outer surfaces curved in transverse cross section;

a transom adjoining the stern edges of said bottom and said sides and extending generally upwardly;

a pair of longitudinally extending keelsons depending downwardly from said bottom, disposed on opposite sides of the longitudinal centerline of said bottom and equally spaced therefrom;

a generally triangular delta formation on said bottom, said delta formation having a base disposed adjacent said transom, an apex disposed adjacent the rear end of said first peak and between said keelsons, and side edges converging from the lateral extremities of said base to said apex, the lower surface of said delta formation tapering downwardly and laterally inwardly from the respective side edges of said delta formation to form a second peak extending along the longitudinal centerline of said bottom from said transom to the rear end of said first peak, and said second peak being inclined upwardly from said transom to the rear end of said first peak.

4,002,132

CATAMARAN WITH PLURAL DRIVES

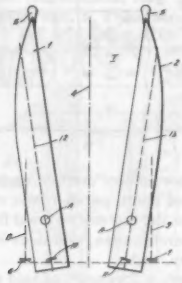
Leopold Nitzki, Bremen, Germany, assignor to Aktiengesellschaft "Weser", Bremen, Germany

Filed May 29, 1975, Ser. No. 581,964

Claims priority, application Germany, June 4, 1974, 2426804

Int. Cl.² B63B *1/10*

U.S. Cl. 114—61 7 Claims



1. A catamaran, comprising two elongated huls each having a longitudinal axis and a pair of opposite side portions laterally spaced from said longitudinal axis, said side portions being substantially parallel to each other and to said longitudinal axis over at least a part of the elongation of a respective hull, said hulls being located at opposite sides of a longitudinal symmetry line of the catamaran and the axes of said hulls being longitudinally inclined relative to said line; and propulsion means on said hulls for propelling said catamaran through the water, said propulsion means comprising for each of said hulls a propeller shaft extending substantially parallel to said longitudinal symmetry line.

4,002,133

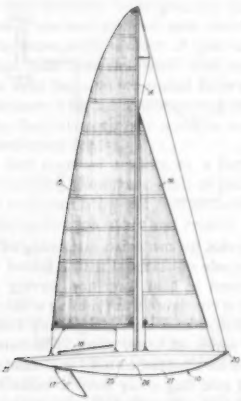
CATAMARAN

John V. Wilbanks, Rte. 1, Box 304, Theodore, Ala. 36582

Continuation of Ser. No. 449,275, March 8, 1974, abandoned. This application Sept. 26, 1975, Ser. No. 616,908

Int. Cl.² B63B *1/12*

U.S. Cl. 114—61 5 Claims



1. In a catamaran having a frame supported by a plurality of double-ended complementary hulls having straight parallel keels with each hull symmetrical with respect to itself and having a bow and a stern at which the sides of the hull converge and through which a hull centerline passes, the improvement comprising each hull being arcuate in side elevation along its keel throughout substantially its length from bow to stern and having the surface of the hull bilge rigid and defining a plurality of concentric circular arcs of increasing and then decreasing radii as measured abeam the centerline throughout substantially its length from the bow and stern, said arcuate keel extending forwardly and rearwardly beyond and above the normal water line of said hull, and said hull below the water line having essentially smooth and unobstructed surfaces as to permit the unobstructed flow of water along the hull bow portion to stern portion.

4,002,134

AQUA-PLANING VEHICLE

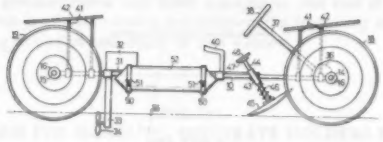
Kuraji Honda, 129 Kita-Kakigase, Gifu, Gifu, Japan

Filed Apr. 8, 1976, Ser. No. 675,130

Claims priority, application Japan, Mar. 12, 1976, 51-29999[U]

Int. Cl.² B63B *1/18*

U.S. Cl. 114—271 7 Claims



1. An aqua-planing vehicle comprising:

a base frame mounted with a pair of freely rotatable buoyant wheels on both sides of the front and rear ends of the frame so that said frame can float on a water surface;

means for propelling the frame forward on the water surface;

a steering handle connected to the buoyant wheels on both sides of the front end of the frame for changing the direction of movement of said frame;

wing members disposed above the frame and slanted upward in the direction of advancement;

high-glide impellers provided below the frame so as to be vertically movable and slanted upward in the direction of advancement;

a steering pedal operatively connected to said high-glide impellers for moving said members downward to strike the water surface to thereby cause the frame to bounce upward during forward movement of the frame; and

buffer members provided on both sides of a lower portion of the frame for easing the impact exerted upon the frame when it lands and impacts on the water surface after a bounce.

4,002,135

SHIP FOR COMBINED LOAD

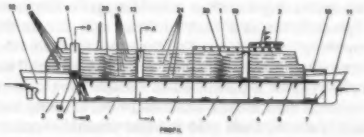
Bengt Wilhelm Tornqvist, Hovslagargatan 5 B, Stockholm, Sweden

Filed Apr. 30, 1975, Ser. No. 572,894

Claims priority, application Sweden, May 15, 1974, 7406502

Int. Cl.² B63B *25/00*

U.S. Cl. 114—72 6 Claims



1. A ship for simultaneously transporting a high density

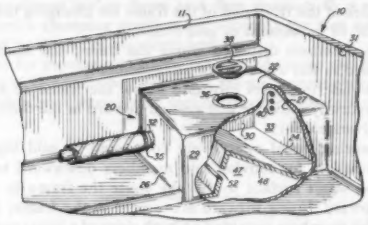
flowable bulk cargo and a lower density general freight comprising a hull having at least one hold to store a flowable bulk cargo therein, general cargo storage means comprising a main deck covering said hold and a plurality of vertically spaced apart loading decks covering said main deck, said loading decks being fixedly mounted on said main deck and extending over a substantial part of the entire length and beam of the ship and preventing access to the hold through that portion of the main deck surmounted by said loading decks, flowable cargo conveying means positioned below said main deck and extending lengthwise of the ship from substantially one to the other end thereof, access means at least one end of the ship beyond the longitudinal ends of the loading decks and above an underlying end portion of said conveying means for supply thereto of said flowable bulk cargo for conveyance thereof from said one to said other end of the ship and for delivery of said cargo during said conveyance to selected sections of the hold, and means forming part of said conveying means for conveying for discharge of said flowable bulk cargo from said hold.

4,002,136

MARINE EXHAUST SYSTEM

Jerome M. Michalak, Cocoa Beach, Fla., assignor to Ray Industries, Inc., Phoenix, Ariz.

Filed Oct. 14, 1975, Ser. No. 621,779
Int. Cl.² B63H 21/32
U.S. Cl. 115—.5 E **3 Claims**



1. An exhaust system for a boat powered by an internal combustion engine having an exhaust pipe, said boat having a hull including a hull surface normally submerged below the water level, said system comprising:

a. a chamber located within the hull including inlet means located above the normal water level and adapted to be connected to the exhaust pipe of the internal combustion engine;

b. exhaust vent means communicating the interior of said chamber with atmosphere, said vent means located at a location normally above the water level; and

c. exhaust port means communicating said chamber interior with a location below the normal water level, said exhaust port means including a recess in said hull surface, said recess having a surface extending generally forwardly and upwardly in said hull surface, said recess defining an opening at a generally forward location therein and spaced upwardly from the plane of said hull surface,

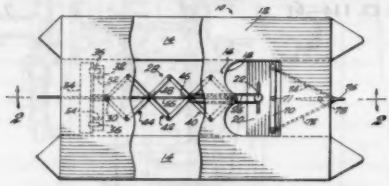
whereby exhaust is permitted to excape from said chamber at said exhaust vent means when said boat is idling and whereby exhaust is drawn from said exhaust chamber under the influence of water flow at said port when said boat is underway thereby reducing exhaust noise.

4,002,137

BUOYANT WATER SCOOTER CRAFT

Charles K. Vrana, 60 Helen Lane, Fort Myers Beach, Fla. 33931

Filed Sept. 15, 1975, Ser. No. 613,206
Int. Cl.² B63H 16/12
U.S. Cl. 115—22 **7 Claims**



1. A buoyant water scooter craft comprising

A. a pair of spaced apart, parallel float members,

B. a deck, fixed to the top sides of said floats and spanning the distance therebetween, said deck including,

1. a seat portion, and

2. a cut out portion forwardly of said seat portion;

C. a foot rest fixed to and spanning the distance between said float members beneath said cut out portion;

D. a generally upstanding operating lever pivotally connected to said foot rest at its lower end for back and forth pivotal movement;

E. a flap pivotally connected in a transverse relation between and adjacent the rear ends of said float members;

F. a drive means connecting between said operating lever and said flap oar to impart a back and forth reciprocating movement to said flap oar upon actuation of said operating lever;

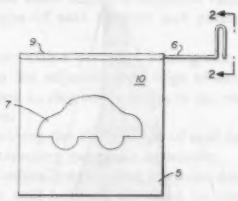
G. a rudder, vertically, centrally, pivotally mounted forwardly of said foot rest, and means to actuate said rudder for steering purposes.

4,002,138

AUTO SAFETY FLAG AND HOLDER

Ronald J. Dobala, 1620 Center Road, West Seneca, N.Y. 14224

Filed Sept. 26, 1975, Ser. No. 616,934
Int. Cl.² B60Q 7/00
U.S. Cl. 116—28 R **1 Claim**



1. A safety device for motorists consisting of a flag and rod, said flag being made of material with a folded over loop, said rod being received in said loop and having a first straight section where it is contiguous to said flag within said loop, said first straight section also extending away from said flag to terminate in a series of other straight sections and angular bends which are all adapted to hold said first straight section of said rod and said flag away from a vehicle window when said device is in use, said series comprising second and third straight sections, the first and second straight sections being tied by a first bend, the second and third straight sections being tied by a 180° second bend such that said second and third sections are in a common plane, the rest of the rod being

tied to said third section by a ninety degree third bend, and the rest of the rod is substantially in a second plane normal to said first plane and adapted to be substantially contiguous to said vehicle window when said device is in use.

4,002,139

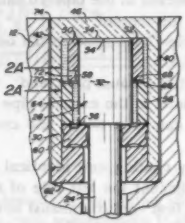
STRAIN INDICATOR

William J. Payne, 1328 Clearview Drive, Greensburg, Pa. 15601

Continuation of Ser. No. 494,638, Aug. 5, 1974, abandoned. This application Feb. 5, 1976, Ser. No. 655,495

Int. Cl.² G01B *5/30*

U.S. Cl. 116—114 R **17 Claims**



1. An optical stress-strain indicator comprising in combination:

a first member subject to stress-strain and having a head and a recess extending from said head into said member;

a second member received within said first member and having a first end and a second end, said first end being secured to said first member;

a fluid holding member having a window, said fluid holding member being secured to said first member with said window substantially adjacent said head so as to be visible;

light-absorbing indicator fluid within said fluid holding member;

a first indicator area in said fluid holding member disposed substantially adjacent said window;

a second indicator area in said fluid holding member disposed substantially adjacent said window and substantially coplanar with said first indicator area;

means independently operatively connecting said first indicator area and said second indicator area to said second end of said second member such that:

a. as said first member undergoes an elastic change in length said second end of said second member is caused to move with respect to said window with the result that said first indicator area and said second indicator area become separated from said window an equal distance with the consequence that said fluid is caused to flow between said window and said first and second indicator areas;

b. as said first member undergoes a further change in length exceeding the elastic limit of said first member, said first indicator area and said second indicator area move relative to each other and assume a non-coplanar relationship.

4,002,140

RADIO STATION IDENTIFIER

Billy Roy Quinn, 12911 Galoway, Apt. 201, Garden Grove, Calif. 92641, and Jimmy Don Quinn, 425 N. Magnolia, Apt. E, Anaheim, Calif. 92801

Filed Oct. 14, 1975, Ser. No. 621,867

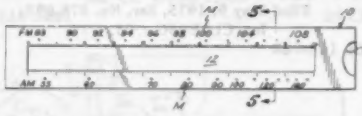
Int. Cl.² G09F *9/40*

U.S. Cl. 116—135 **4 Claims**

1. A radio station identifier for correlating the call letters of a sending station with the frequency thereof, comprising:

a rectangular plastic envelope formed by compressing with heat a section of plastic tubing, said envelope including openings at the ends thereof, a rectangular window in one surface thereof, and a transverse cut-out formed at one of said ends in the other surface thereof for providing an index line for visual alignment;

a rectangular slide receivable within the interior of said envelope and conformed for translation therein having a



longitudinal dimension substantially equal to the longitudinal dimension of said envelope;

frequency markings formed on said envelope adjacent the longitudinal edges of said window; and

call letter markings formed on said slide in corresponding relationship with at least one end thereof for alignment of a predetermined call letter marking in one end of said slide is aligned relative a corresponding frequency marking at one of said edges of said window.

4,002,141

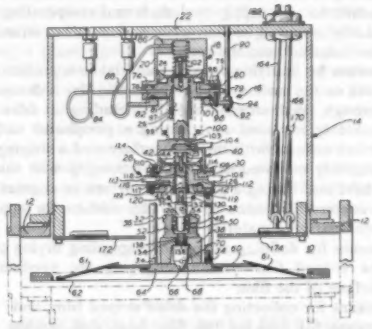
SYSTEM FOR HANDLING SUBSTRATE HOLDERS FOR VACUUM COATING

Robert L. Shrader, Castro Valley, Calif., assignor to Airco, Inc., Montvale, N.J.

Filed Nov. 26, 1975, Ser. No. 635,513

Int. Cl.² C23C *13/08*

U.S. Cl. 118—49 **17 Claims**



17. In vacuum coating apparatus, mechanism disposed within a vacuum chamber for vertically moving and rotating a substrate holder, comprising:

a. a main actuator mounted in the chamber and having a first vertically moveable operating member;

b. an auxiliary actuator connected to and bodily moveable with the first operating member and having a second vertically moveable operating member;

c. coacting magnet elements including a permanent magnet and an armature therefor;

d. one magnet element being connected to and bodily moveable with the second operating member and the other element being mounted on the holder to make magnetic coupling between the holder and auxiliary actuator whereby the holder can be bodily elevated by the main actuator for substrate coating;

e. means for independently rotating the elevated coupled magnet elements and holder as a unit, and

f. means fixed with respect to the main operating member

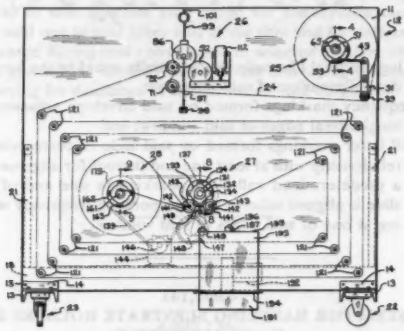
and overlying and abutting the holder in its lowered position whereby elevation of the respective magnet element by the second operating member causes separation of the magnet elements to uncouple the holder.

4,002,142

FILM STRIPING APPARATUS

Dean H. Putnam, Toledo, Ohio, assignor to Dietzgen Corporation, Chicago, Ill.

Filed May 9, 1975, Ser. No. 576,093
Int. Cl.² B05C *1/08, 1/16*
U.S. Cl. 118—68 **9 Claims**



1. An apparatus for applying a stripe to a surface of a continuous strip of photographic film, comprising:
   a. means for storing the unstriped photographic film, said storage means including a film strip tensioning means, a rotatably mounted supply reel shaft for receiving a roll of unstriped film wound on a reel and a friction disc attached to said supply reel shaft and cooperating with a fixedly mounted friction plate to prevent overrunning of the reel shaft and the reel;
   b. means for applying striping material to a predetermined zone on the surface of the film as the film is drawn therethrough, said striping means including a drive wheel rotatably mounted and having a peripheral surface in driven contact with the film surface and a striping wheel rotatably mounted in driven relationship with said drive wheel and having a peripheral surface in contact with a predetermined zone of said film surface for applying a liquid striping material thereto;
   c. means for defining an inwardly spiraling drying path for the striped film without engaging the predetermined surface of the film;
   d. means for collecting the dried striped film; and
   e. means for drawing the film from said storage means, through said striping means and said drying path defining means, and to said collecting means, said drawing means including a rotatably mounted drawing roller having a peripheral surface for engagement with the film surface, means for driving said drawing roller, and a pair of flanged rollers rotatably mounted for guiding the film surface into contact with a predetermined portion of said peripheral surface of said drawing roller.

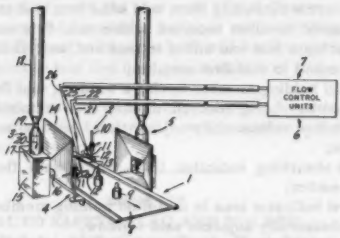
4,002,143

HOT END GLASS CONTAINER COATING SYSTEM

Jerry D. Dover, Ware Shoals, S.C., assignor to Indian Head Inc., New York, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,003
Int. Cl.² B05C *15/00*
U.S. Cl. 118—610 **1 Claim**

1. A hot end glass container air-atomized liquid spray-coating system comprising, in combination,
   1. a conveyor unit having an endless conveyor belt for transporting a single file of hot glass containers from a glass-forming machine to an annealing lehr;
   2. a first spray coating unit adjacent the right side of the conveyor belt which comprises
      a. a nozzle holder,
      b. at least one air-atomized coating liquid spray nozzle adjustably mounted on the nozzle holder, and
      c. a rotatable tip on the spray nozzle having a slit opening oriented across the conveyor belt;
   3. a first venturi exhaust unit adjacent the left side of the conveyor belt and directly across the conveyor belt from the first spray coating unit which comprises
      a. a tapered shield facing the conveyor belt,
      b. a separate catchbox having an inlet in the face thereof directly connected to the tapered shield and having an outlet in the top thereof,
      c. an exhaust pipe connected to the outlet of the catchbox,
      d. a venturi in the exhaust pipe, and
      e. an air draft inlet in the exhaust pipe between the venturi and the catchbox outlet and connected to an air source;
   4. a second spray coating unit identical to the first spray coating unit adjacent the left side of the conveyor belt and beside the first venturi exhaust unit;
   5. a second venturi exhaust unit identical to the first venturi exhaust unit adjacent the right side of the conveyor belt



and directly across the conveyor belt from the second spray coating unit;
   6. an air flow control unit which comprises
      a. first and second air lines connected to the air-atomized coating liquid spray nozzles of the first and second spray coating units, respectively,
      b. an air pressure regulator connected to both the first and second air lines, and
      c. an air pump connected to the air pressure regulator; and
   7. a coating liquid measuring and flow control unit which comprises
      a. first and second coating liquid lines connected to the air-atomized coating liquid spray nozzles of the first and second spray coating units, respectively,
      b. flow rate measuring drippers separately connected in each of the coating liquid lines,
      c. flow control valves in each of the coating liquid lines and separately connected to each of the flow rate measuring drippers,
      d. a sediment strainer connected to both flow control valves,
      e. an air pressurized supply tank for a heat decomposable coating liquid connected to the sediment strainer via a dip tube, and
      f. an air pressure regulator connected to the coating liquid supply tank and to the air pump.

4,002,144

INSTALLATION FOR COATING SUBSTANTIALLY U-SHAPED OR V-SHAPED ARTICLES

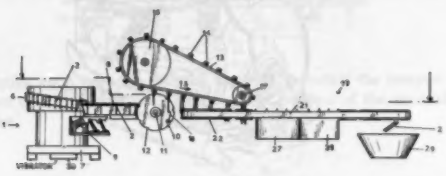
Marcello Lang, Milan, and Leonaldo Ansaldo, S. Alessio (Lucca), both of Italy, assignors to Ato Chimie, Courbevoie, France

Filed May 8, 1975, Ser. No. 575,706

Claims priority, application France, July 17, 1974, 74.24797

Int. Cl.² B05C *19/02*

U.S. Cl. 118—630 3 Claims



1. An improved installation including treatment stations for applying a coating onto substantially U-shaped or V-shaped articles, such as hair curlers or hair pins, said treatment stations comprising a coating station at which a powderous plastic material is applied to those portions of said articles which are to be coated, and a heating station for heating the aforementioned article portions, said installation further comprising feeding means for feeding said articles to said coating and heating stations, the improvement wherein said feeding means comprises a substantially cylindrical container, inlet end means for introducing said articles in bulk to said container, vibrating means for vibrating said container in three mutually perpendicular directions, a spiral shaped blade on the bottom of said container and extending to the wall of said container, a helical path on said wall of said container connected to the spiral shaped blade and extending upward from said container to the top thereof, a downwardly extending helical path on the outside of said container connected to said upwardly extending helical path whereby said articles fed to said container in bulk are moved by said vibrations up the inner wall of said container and down the outer wall thereof along said upward and downwardly extending helical paths, a substantially horizontal notched longitudinally vibrating rod having one end near a lower end of said downwardly extending helical path for receiving and linearly displacing articles transported along said downwardly extending helical path from said one end of said rod to the other end thereof, a rotating wheel having regularly spaced notches at the other end of said rod and aligned therewith for receiving said linearly displaced articles and for regularly spacing and upwardly displacing said articles along a circular path, said separation being in accordance with the separation of said notches on said wheel, an endless moving belt provided with regularly spaced outwardly protruding magnets, a portion of said belt being above and adjacent the highest point of said wheel, the speed of said belt and the separation of said magnets being equivalent to the peripheral speed of said notched wheel and the separation between notches of said wheel, the wheel and belt being synchronously moved to register the magnets and the notches in the wheel whereby said magnets lift said articles from the highest point of the wheel and transport said articles away from said wheel, and a pair of abutting synchronously moving additional endless belts proximate the belt provided with said magnets for receiving said articles carried by said magnets and for transporting said articles to said treatment stations with only those portions of the articles to be coated protruding from said pair of abutting endless belts.

4,002,145

APPARATUS FOR APPLYING AND FIXING A MAGNETIZABLE POWDER ON A CHARGED SHEET

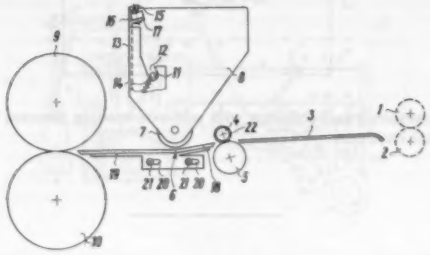
Kurt Moser; Helmut Wegmann, both of Gerlingen, and Reinhold Weigele, Korntal, all of Germany, assignors to Develop KG/Dr. Eisbein and Co., Germany

Filed Aug. 16, 1974, Ser. No. 498,235

Claims priority, application Germany, Aug. 16, 1973, 2341529

Int. Cl.² G03G *13/08*

U.S. Cl. 118—661 29 Claims



1. Apparatus for applying and fixing a magnetizable powder on a coated and electrostatically charged sheet of paper or the like being transported therethrough, the apparatus comprising: guide surface means for guiding the movement of the paper, said guide surface means including an inlet side and an outlet side, conveying means disposed at the inlet side of said guide surface means for conveying the sheet thereto, dispenser means positioned above said guide surface means for dispensing and applying the magnetizable powder to the paper on said guide surface means, said dispenser means including a powder container means and a magnetic roller means rotatably mounted therein and projecting therefrom in the direction of said guide surface means, said guide surface means including a planar guide surface from said magnetic roller means, said conveying means being inclined at an acute angle with respect to said planar guide surface, and means provided at the outlet side of said guide surface means for transporting the paper therefrom and setting the powder on the paper including at least one pair of pressure rollers disposed at the outlet side of said guide surface means, each of said pressure rollers being mounted on a shaft, the axis of the shafts being arranged at a mutual angle with respect to each other.

4,002,146

INSECT COLLECTION AND FEEDING

Gregor N. Neff, 85 Myrtle Ave., Dobbs Ferry, N.Y. 10522

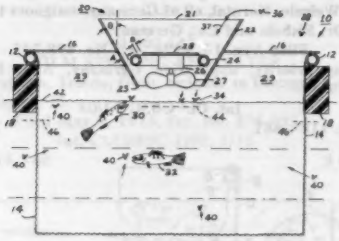
Continuation-in-part of Ser. No. 460,619, April 12, 1974, Pat. No. 3,939,802, which is a continuation-in-part of Ser. No. 213,966, Dec. 30, 1971, abandoned, and a continuation-in-part of Ser. No. 477,839, June 10, 1974, and a continuation-in-part of Ser. No. 497,540, Aug. 14, 1970, Pat. No. 3,951,104. This application Jan. 30, 1975, Ser. No. 545,514

Int. Cl.² A01K *5/00*

U.S. Cl. 119—51 R 11 Claims

1. A device for feeding aquatic animals, said device comprising means for restraining insects adjacent a body of water containing said aquatic animals, an insect collector operatively connected to said restraining means and having an upwardly facing entrance and a downwardly facing exit opening, an insect attractor mounted substantially entirely within said collector near said exit opening, said exit opening being directed to said restraining means, and said restraining means comprising means for forming an insect enclosure over said body of water, the walls of said collector being substantially

opaque, said attractor being a lamp which is hidden from horizontal view, and means connected to said enclosure for



positioning said collector with said exit opening directed into said enclosure.

4,002,147

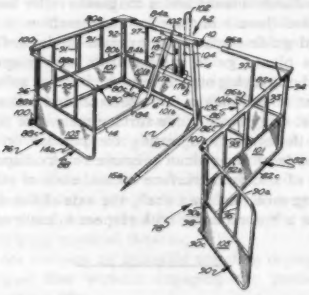
BALE HANDLING APPARATUS

Leon G. Feterl, Salem, S. Dak., assignor to SOS Consolidated, Inc., Birmingham, Mich.

Continuation-in-part of Ser. No. 452,440, March 18, 1974, Pat. No. 3,892,202. This application June 27, 1975, Ser. No. 591,112

Int. Cl.² A01K *5/00*

U.S. Cl. 119—60 **17 Claims**



10. A separable assembly of a lift fork and container wall structure for handling and feeding hay bales comprising:

a lift fork unit comprising an upright frame and a pair of spaced apart lift arms projecting generally horizontally from adjacent the bottom of said frame; and

a pair of upright wall assemblies removably secured to opposite sides of said upright frame of said lift fork unit and having wall means cooperating with said upright frame to define a hay bale containing enclosure, and said wall means having open spaces therein through which livestock may project their heads to feed on a hay bale contained within said enclosure on said lift arms, whereby said lift fork unit may be used alone for lifting purposes or in combination with said removable, upright wall assemblies for transporting and feeding hay bales; and

gate means movably mounted at the front end of said wall means for movement from a closed position across the normally open front end of said enclosure to an open, non-obstructing position with respect to the front end of said enclosure for picking up a hay bale therein on said lift arms.

4,002,148

GRATE ASSEMBLY FOR A BOILER

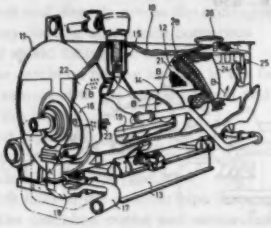
Brian Harding, West Bromwich, England, assignor to Parkinson Cowan GWB Limited, Dudley, England

Filed Apr. 7, 1975, Ser. No. 565,534

Claims priority, application United Kingdom, Apr. 11, 1974, 16133/74

Int. Cl.² F22B *7/12*; F23H *11/10*

U.S. Cl. 122—149 **13 Claims**



1. A grate assembly comprising a fire bed supporting means including a first support member having a plurality of apertures extending therethrough and a second support member, said members being mounted for mutual relative movement between a first position in which the apertures in the first member are obturated by the second member, and a second position in which the apertures are not obturated by the second member, a drive means for causing said relative movement between said first and second positions at a speed to permit passage of ash through the apertures whilst continuing to support a fire bed and wherein one of the support members is provided with air feed passageways whereby air may be fed to a firebed supported on said means.

11. A shell boiler comprising a tubular shell with its axes arranged horizontally with at least one furnace tube extending inwardly from the front end of the shell with each furnace tube being mounted at its rear end in an opening in the front wall of a combustion chamber including, positioned in each furnace tube, a grate assembly comprising a fire bed supporting means including a first support member having a plurality of apertures extending therethrough and a second support member, said members being mounted for mutual relative movement between a first position in which the apertures in the first member are obturated by the second member, and a second position in which the apertures are not obturated by the second member and a drive means for causing said relative movement between said first and second positions at a speed to permit passage of ash through the apertures whilst continuing to support a fire bed and wherein one of the support members is provided with a feed passageway whereby air may be fed to a fire bed supported on said means.

4,002,149

ARRANGEMENT OF HEAT TRANSFER TUBES IN A HEATING FURNACE

Etsuji Yamamoto, Tokyo, and Noriaki Nakase, Osaka, both of Japan, assignors to Mitsui Shipbuilding and Engineering Co., Ltd. and Mitsui Petrochemical Industries, Ltd., both of Tokyo, Japan

Filed Aug. 28, 1975, Ser. No. 608,622

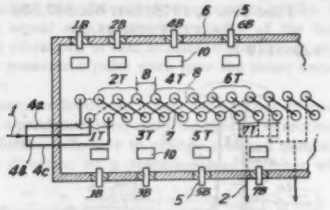
Claims priority, application Japan, Sept. 4, 1974, 49-101658; June 24, 1975, 50-78156

Int. Cl.² F22B *21/24*

U.S. Cl. 122—356 **9 Claims**

1. A heating furnace for fluid material having a plurality of heat-transfer tubes carrying said fluid through the furnace, each tube having a plurality of parallel heat-transfer portions connected together by return bends, said parallel portions being disposed in two rows, the parallel portions of each tube alternating between said rows, the portions in each row being

arranged in groups consisting of one heat-transfer portion of each of said tubes, the fluid in all tubes flowing through the same sequence of groups, and a separate burner means con-



fronting each group to thereby separately control the temperature of the fluid in each heat-transfer portion of the several tubes.

4,002,150

GAS GENERATOR FOR MOUNTING ON AN AUTOMOBILE

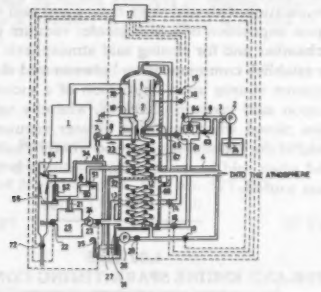
Hiroshi Shinohara, Okazaki; Kunihiko Masunaga; Masakatsu Kani, both of Toyota, and Hidetomo Umehara, Susono, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Mar. 10, 1975, Ser. No. 557,119

Claims priority, application Japan, Aug. 12, 1974, 49-092199

Int. Cl.² F02B *43/00*

U.S. Cl. 123—3 **11 Claims**



1. A gas generator comprising:

a. a chamber for holding a liquid fuel,

b. a catalyst bed connected to receive liquid fuel from said chamber and adapted to at least partially convert said liquid fuel to a gas,

c. a gas tank connected to said bed to receive gas generated in said catalyst bed when contacted by said liquid fuel,

d. a carburetor,

e. first duct means for conveying liquid fuel from said chamber to said carburetor and a first pressure-responsive valve for controlling the flow in said first duct means, said first valve being responsive to the pressure in said gas tank to close said first duct means only when the pressure in said gas tank exceeds a predetermined value, and

f. second duct means connecting said gas tank to said carburetor and additional valve means for controlling the flow in said second duct means, said additional valve means being connected to open said second duct means when gas is generated in said catalyst bed.

4,002,151

DIESEL ENGINE AND METHOD FOR IMPROVING THE PERFORMANCE THEREOF

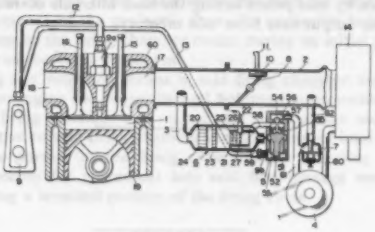
Eiji Toyoda, Toyota; Masaaki Noguchi, Nagoya; Yukiyasu Tanaka; Tsuchio Bunda, both of Okazaki, and Masaharu Sumiyoshi, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed May 6, 1975, Ser. No. 574,935

Claims priority, application Japan, May 13, 1974, 49-53710

Int. Cl.² F02B *43/08*

U.S. Cl. 123—3 **17 Claims**



1. A method for improving the performance of a diesel engine comprising the steps of:

introducing a first mixture of a first quantity of fuel and a second quantity of air into a reformer;

reforming said first quantity of fuel in the presence of said second quantity of air into a second mixture containing decomposition and oxidation products;

feeding said second mixture to a combustion chamber of said engine;

feeding a third quantity of air to said combustion chamber, wherein said third quantity of air has not passed through said reformer;

injecting a fourth quantity of fuel into said combustion chamber, wherein said fourth quantity of fuel has not passed through said reformer;

burning said second mixture and said fourth quantity of fuel in said combustion chamber.

4,002,152

FUEL INJECTION CONTROL APPARATUS

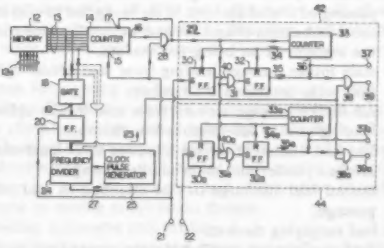
Yoshikazu Hoshi, Ibaraki, Japan, assignor to Hitachi, Ltd., Japan

Filed July 14, 1975, Ser. No. 595,498

Claims priority, application Japan, July 19, 1974, 49-82188

Int. Cl.² F02B *3/00*

U.S. Cl. 123—32 EA **4 Claims**



1. In a fuel injection control apparatus comprising a memory for producing an output representing a required amount of fuel injection in accordance with the engine operating conditions, a first injection valve for supplying fuel to said engine, a second injection valve for supplying fuel to said engine when

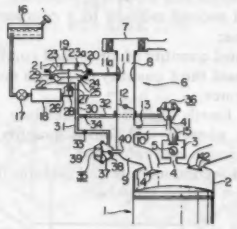
the load on said engine is great, and means for introducing fuel injected through said first and second fuel injection valves to a combustion chamber, said apparatus producing pulses having time intervals corresponding to the data produced from said memory, said first and second fuel injection valves being driven for fuel injection in response to said pulses; the improvement further comprising detector means for detecting an injection control signal produced together with said data produced in accordance with the engine operating conditions, and first gate means for controlling said second injection valve, said first gate means being energized in response to said injection control signal, said second injection valve being driven by said pulses having the time intervals corresponding to the output data from said memory.

4,002,153

INTAKE SYSTEM IN INTERNAL COMBUSTION ENGINE

Hisanori Moriya, and Shoji Shimo, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 4, 1975, Ser. No. 601,665
Claims priority, application Japan, Aug. 16, 1974, 49-94016
Int. Cl.² F02B *19/10, 19/18*
U.S. Cl. 123—32 ST **10 Claims**



1. In an intake system adapted to be used in combination with an internal combustion engine including a main combustion chamber, a sub-combustion chamber equipped with an ignition plug, and a through-hole communicating said both chambers with each other, whereby a lean mixture charge in the main combustion chamber is fired by combustion flames produced in said sub-combustion chamber, the improvements comprising;

an intake cylinder having a venturi portion allowing the passing of a total amount of air being fed to said main and sub-combustion chambers and a throttle valve controlling the amount of air being fed thereto;

a main intake passage leading from said intake cylinder to said main combustion chamber;

a sub-intake passage stemed from said intake cylinder and leading to said sub-combustion chamber;

a first fuel discharge device attached to at least one of said intake cylinder and main intake passage;

a second fuel discharge device attached to said sub-intake passage;

a fuel supplying device;

a fuel pressure controlling device connected to said fuel supplying device and producing a fuel pressure commensurate with a negative pressure in said venturi portion;

a first fuel passage communicating said fuel pressure controlling device with said first fuel discharge device; and,

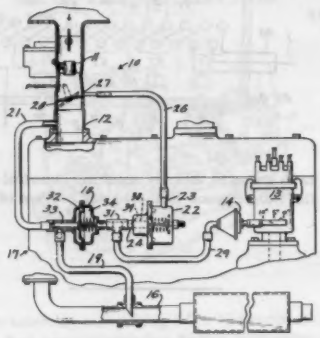
a second fuel passage communicating said fuel pressure controlling device with said second fuel discharge device.

4,002,154

VACUUM DELAY AND SHUTOFF VALVE

Michael A. Kestner, Richmond, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed Feb. 6, 1975, Ser. No. 547,386
Int. Cl.² F02M *25/00*
U.S. Cl. 123—119 A **2 Claims**



1. An exhaust gas recirculation system for an internal combustion engine comprising an EGR valve for admitting, upon opening, a portion of exhaust gases to an intake manifold, a slave vacuum responsive means for opening said EGR valve upon introduction of a vacuum upon said slave means, means for establishing an open circuit between said slave means and a carburetor vacuum source, a master vacuum responsive means within said circuit and in continuous open communication between said slave means and the vacuum source, said master means actuating said slave means, said master comprising a vacuum sensing chamber open to the vacuum source and an atmospheric release chamber open to atmosphere, valve means for opening said atmospheric release chamber into communication with said slave means and said vacuum chamber upon imposition of a first greater vacuum upon said vacuum chamber and for closing said atmospheric release chamber to establish communication between said slave means and the vacuum source upon imposition of a second, lesser vacuum upon said vacuum chamber, whereby said EGR valve remains closed when said first greater vacuum condition is imposed at the vacuum source, and whereby said EGR valve is opened when said lesser vacuum condition is imposed at the vacuum source.

4,002,155

ENGINE AND ENGINE SPARK TIMING CONTROL WITH KNOCK LIMITING ETC.

John L. Harned, Grosse Pointe Woods, and Donald F. Herrick, Ann Arbor, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 12, 1976, Ser. No. 648,313
Int. Cl.² F02P *11/02*
U.S. Cl. 123—148 E **11 Claims**

1. In an apparatus to generate sparking voltages at the spark electrodes of the respective cylinders of a spark ignition internal combustion engine in automotive application, the improvement comprising:

first means responsive at least to engine crankshaft rotation and effective to generate programmed spark voltage pulses and apply the same to the engine cylinders in sequence for the successive firings of each engine cylinder;

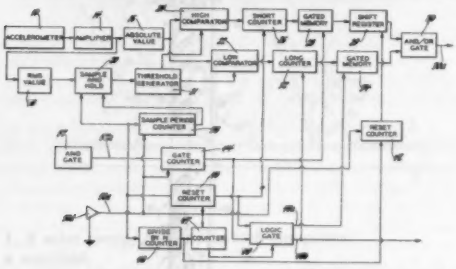
an accelerometer responsive to the background engine vibrations due to engine operation and the individual ringing engine vibrations due to engine knock;

a sampler responsive to the magnitude of the accelerometer signal during successive sample periods terminating, re-

spectively, before ringing vibrations due to engine knock commence and effective to generate an output signal varying generally with the average magnitude of said accelerometer signal without said ringing vibrations;

a comparator simultaneously responsive to the sampler output signal and to the magnitudes of the individual ringing vibrations in said accelerometer signal and effective to generate a pulse each time the latter exceeds the former;

second means effective to count the number of said pulses during a predetermined counting time, said second means being further effective to change a stored number count in one direction by a predetermined number when the



number of said pulses during said predetermined counting time exceeds a first reference number and to change said stored number count in the opposite direction by a predetermined number when the number of said pulses during said predetermined counting time does not exceed a second predetermined reference number no greater than said first predetermined reference number;

and means responsive to said second means to retard the sparking events due to said first means by a predetermined amount for each count stored by said second means and in sense to delay the spark as the second means senses increased numbers of ringing vibrations;

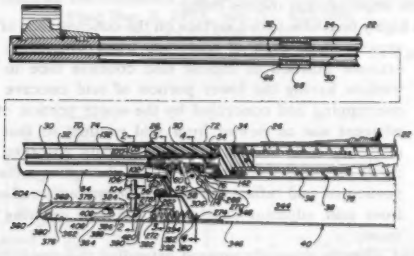
whereby knock intensity in said engine is limited to a desired level.

4,002,156

AIR GUN

Earl L. Fischer, Bentonville, Ark., assignor to Victor Comptometer Corporation, Chicago, Ill.

Filed May 14, 1975, Ser. No. 577,203
Int. Cl.² F41B *11/00*
U.S. Cl. 124—67 **27 Claims**



1. An air gun or the like for propelling a projectile by compressed air or the like and comprising:

a source of compressed air for propelling a projectile from the gun;

barrel means for guiding the projectile from the gun;

firing chamber means between said source of compressed air and said barrel means for holding a projectile in a firing position;

first passage means for connecting said firing chamber means to said barrel means and for guiding a projectile from said firing chamber means to said barrel means;

trigger means for initiating a firing cycle during which compressed air is delivered to said firing chamber means from said source of compressed air to propel a projectile from the gun through said barrel means;

projectile holding means for receiving a projectile to be fired from the gun and for holding the projectile in axially spaced relationship to said firing chamber means until the firing cycle is initiated by actuation of said trigger means;

second passage means for connecting said projectile holding means to said firing chamber means and for enabling movement of the projectile from the projectile holding means to the firing chamber means during an initial portion of the firing cycle; and

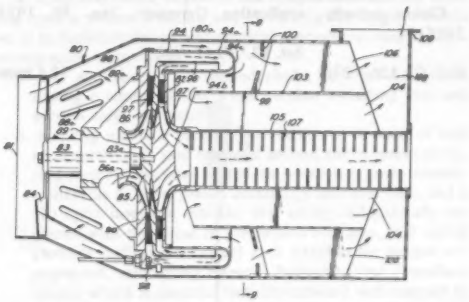
sealing and retention means in said firing chamber means for engaging the projectile and holding the projectile in the firing chamber and sealing said first passage means relative to said firing chamber means during an intermediate portion of the firing cycle and for releasing the projectile for movement into said first passage means during a terminal portion of the firing cycle.

4,002,157

GAS TURBINE HEATING APPARATUS

Rene A. M Toesca, Boyertown, Pa., assignor to Energy Transformation Corporation, Boyertown, Pa.

Filed Dec. 31, 1974, Ser. No. 537,717
Int. Cl.² F24H *3/08*
U.S. Cl. 126—110 B **20 Claims**



1. Heating apparatus comprising:

a. a combustion chamber having walls formed to cause exhaust gas to travel initially in a first direction and then to travel in a second direction opposite thereto,

b. an air flow chamber adjacent thereto and being formed to conduct incoming air first past the outer wall of said combustion chamber in said first direction, and then past the inner wall of said combustion chamber in said second direction, and

c. means for causing air to enter said apparatus and for causing a first portion thereof to circulate through said air flow chamber whereupon it is heated by the walls of said combustion chamber prior to its being applied to heat a predetermined area, said means also causing a second portion of said air to enter said combustion chamber thereby to enable combustion therein.

13. Heating apparatus comprising:

a. a chamber having outer and inner, generally cylindrical and parallel walls,

b. a combustion chamber disposed within said (a) chamber and including means for continuously burning a fuel in air therein, said chamber having outer and inner parallel, generally cylindrical, heat-conducting walls,

c. an exhaust duct having a substantial portion thereof

surrounded by the inner wall of said (a) chamber, said duct having a heat-conductive wall communicating with said (b) chamber,

d. means for causing air to enter said apparatus, said means including:

1. means to cause a portion of said air to flow through said (a) chamber and along the outer surface of the heat-conducting wall of said exhaust duct when combustion of said fuel has heated the heat-conducting wall of said combustion chamber, said air thereupon being heated and being adapted to be applied to heat a predetermined area, and

2. means for causing another portion of said air to enter said combustion chamber thereby to enable combustion of said fuel to occur, the amount of said other portion being such that the air-fuel ratio in said combustion chamber is allowed to approach stoichiometric conditions.

4,002,158

SUPPORT STRUCTURE FOR SOLAR ENERGY CONVERTER

Reinhart Radebold, Quastenhornweg 14a, 1 Berlin 22, Germany

Filed Jan. 29, 1975, Ser. No. 545,134

Claims priority, application Germany, Jan. 30, 1974, 2405134

Int. Cl.² F24J 3/02

U.S. Cl. 126—270 **12 Claims**

1. In a solar energy conversion system having a plurality of solar energy absorbing and conversion units, each provided with a reflector to focus solar energy to an absorbing portion of the conversion unit, a support structure, comprising:

a plurality of tubes leading upright from the ground to the conversion units of the plurality, the tubes having means to form the tubes into a need-like bundle; means for anchoring the bundle tubes to the ground; means to resiliently fasten and suspend the reflectors and conversion units to the top of the reed-like bundle;

means included in the bundle for transporting energy from the conversion units to the ground; and

means at the top of the bundle to obtain buoyancy support of the reflectors and the conversion units as fastened to the top of the bundle.

4,002,159

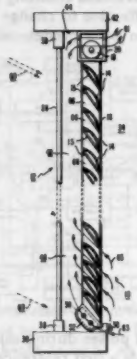
VENETIAN BLIND FOR SOLAR HEATING

Domenick J. Angilletta, 223 E. Knight Ave., Collingswood, N.J. 08108

Filed Nov. 7, 1975, Ser. No. 629,693

Int. Cl.² F24J 3/02

U.S. Cl. 126—270 **7 Claims**



1. In a venetian blind for use in a room adjacent the pane of a window disposed to receive solar radiation and spaced therefrom:

a head rail attached to the frame of said window;

a tilt rod pivotably attached within said head rail;

a series of arcuate slats suspended vertically from said tilt rod and means flexibly interconnecting said slats in horizontally-oriented and vertically spaced relation;

a bottom rail flexibly interconnected with said series of slats;

means to pivot said tilt rod whereby said series of interconnected slats is reversibly tilted to present said arcuate slats at certain extreme positions with either concave or convex faces of said slats facing said window and substantially parallel thereto, and at intermediate positions;

means to raise, lower and reversibly fix said bottom rail and portions of said slats whereby said venetian blind is adjusted to expose without obstruction portions of said window;

the improvement therein being:

a highly heat-absorptive surface on the concave face of said arcuate slats, each of said slats when pivoted in said extreme position to expose said concave face to said window having the lower portion of said concave face overlapping and concealed by the upper portion of the adjacent slat as viewed from said window so that said incoming solar radiation is substantially absorbed and partly reflected upon impinging said absorptive surface, a portion of said reflected radiation secondarily reflecting from said adjacent overlapped slat and entering said room,

and an open generally upward extending passage between each of said slats and the upper portion of the slat next lower;

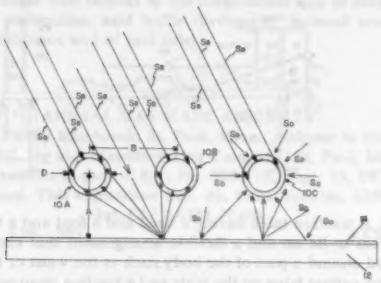
air passage means at said head rail connecting between said room and said window;

whereby solar radiation impinging on said absorptive surface heats said surface and heat transfers to air passing upwardly by natural convection through said passages between said slats and through said passage means at said head rail.

4,002,160
SOLAR ENERGY COLLECTION SYSTEM

George R. Mather, Jr., Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 12, 1975, Ser. No. 549,291
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 7 Claims

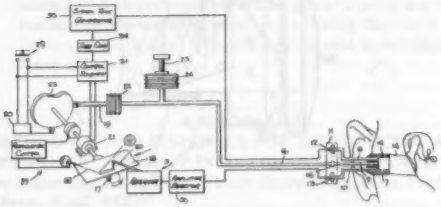


1. A solar energy collector which comprises:
a manifold;
a plurality of double-wall tubular members, the space between said double walls being sealed at a subatmospheric pressure, each having a closed end remote from said manifold and an open end in sealing engagement with said manifold, the outer wall of said double-wall member being a transparent glass material and is transparent about its entire circumference, said double-wall tubular members being spaced apart on centers no more than four times the diameter of said tubular members;
means for supplying a working fluid from said manifold to the interior of said plurality of tubular members and returning said working fluid to said manifold; and
a diffuse-reflecting surface positioned on the side of said tubular members away from the sun and being coextensive with all of said tubular members, said diffuse-reflecting surface being positioned a distance no more than four times the diameter of said tubular members away from the center line of said tubular members.

4,002,161
AUTOMATIC MEANS FOR TYMPANOMETRIC TESTING

Irwin Klar, New City; Erwin H. Rock, Dobbs Ferry, both of N.Y., and Arthur W. Rochussen, Nashua, N.H., assignors to American Electromedics Corporation, Dobbs Ferry, N.Y.

Filed Dec. 2, 1975, Ser. No. 637,008
Int. Cl.² A61B 5/12
U.S. Cl. 128—2 Z 21 Claims

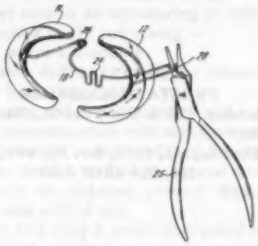


1. An improved automatic means for tympanometric ear testing including an ear probe having means for transmitting and for receiving audio test signals and having an ear canal seal and an air transmission tube for controlling the sealed ear canal pressure in combination with a recorder including a recording chart with a drive means therefor, means for varying the air pressure in the sealed ear canal through said probe air transmission tube, means for synchronizing the variations of the air pressure with the movement of the driven recording chart, means for generating an audio frequency probe tone signal for said transmitting means, and means for coupling said probe signal receiving means to said recorder.

4,002,162
LIP AND CHEEK EXPANDER AND TONGUE RETRACTOR WITH TORTIONALLY ADJUSTABLE SPRING MEANS

Jacob I. Weisser, 28-15 Fair Lawn Ave., Fair Lawn, N.J. 07410

Filed Apr. 26, 1976, Ser. No. 680,433
Int. Cl.² A61B 1/32
U.S. Cl. 128—17 8 Claims



1. A lip and cheek expander and tongue retractor for holding open a patient's mouth and stabilizing his tongue therein so as to facilitate dental and medical procedures, said expander-retractor comprising:
a. first and second arc-shaped shells, each of said shells having a trough-shaped cross-section including first and second side walls; and
b. a spring element having two ends, one of each of said ends secured to said first and second shells respectively, said element disposed in a plane which is (i) substantially transverse to those planes defined by said side walls and is (ii) upon insertion into the oral cavity, substantially coplaner with the plane of the patient's tongue, said spring element including a lingual arch adapted for tongue engagement, said spring element further having a resilient torque which is directed radially outward with respect to the radius of curvature of said arc-shaped shells,
whereby the lips and cheeks of a patient are engaged within the troughs of said shells and the tongue of said patient is engaged within said rake-like lingual arch such that, through the torque action of said spring element, the tongue is stabilized in a retracted position while the lips and cheeks are biased laterally outward with respect to the dental area.

4,002,163
EXERCISER AND ROLLER MASSAGE DEVICE

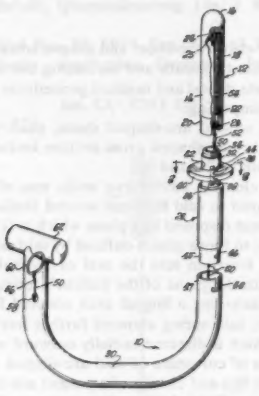
Andrew Dudly Jackson, Jr., Raymondville, Port Mansfield Station, Tex. 78580

Filed Sept. 15, 1975, Ser. No. 613,117
Int. Cl.² A61H 15/00
U.S. Cl. 128—57 7 Claims

1. An exerciser comprising
a core and

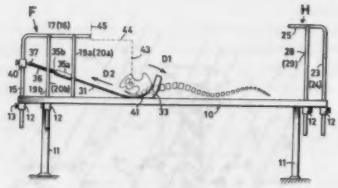
several sleeves rotatably mounted along the length of the core,
the end sleeves being of a diameter and length to provide hand grips,
a center sleeve being of a length comparable to the width of the human body to provide a body roller,
and pivot means at the ends of the core,
said sleeves being three in number and all of the same internal and external diameter disposed end to end along the core, and the center sleeve being provided with a covering of soft material.

4,002,164
PROSTATE MASSAGER
Willie Ray Bradley, 175 S. Rio Vista St., No. 146, Anaheim, Calif. 92806
Filed Sept. 2, 1975, Ser. No. 609,207
Int. Cl.² A61H *7/00*
U.S. Cl. 128—67 **5 Claims**



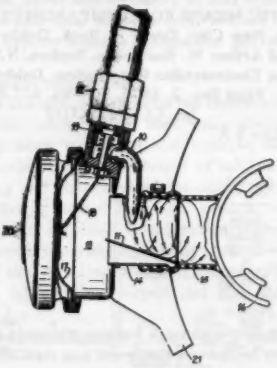
1. A prostate-massaging device comprising:
a flexible, digital-massaging head;
a handle means, whereby said digital head is removably attached thereto, said handle being tubular and shaped in a substantially U-shaped configuration, wherein one end thereof is provided with a grip bar;
an insert-depth control means adjustably mounted to said handle adjacent said digital head to selectively control the depth of insertion into the rectum of an individual, whereby said digital head is positioned adjacent the prostate gland; and
manipulating means included therein which is operably attached to said digital head, whereby said head is actuated in a massaging action with respect to said prostate gland, and
wherein said digital head includes:
a base member molded to the base of said digital head, said digital head being formed from a soft, flexible material, and
an elongated, flat spring member secured to said base member and disposed within said digital head, said spring having a free end attached to said manipulating means.

4,002,165
AUTO-TRACTION TABLE
Gertrud Agnes Matilda Lind, Grev Turegatan 22, 114 38 Stockholm, Sweden
Filed May 7, 1975, Ser. No. 575,214
Int. Cl.² A61F *5/00*
U.S. Cl. 128—71 **15 Claims**



1. A traction table having a head and a foot and a top for a patient to lie on and a flexible arrangement that can be fastened around a part of the body such as the waist or the head of the patient lying on the table and a traction strap secured to a holder fastened at one end of the table, a pipe frame at the head (H) and at the foot (F) of the table, said frame at the foot comprising a transverse pipe (**18**) spaced above the tabletop (**10**, **10***a* and **10***b*) to provide a foot stop for the patient lying supine with the legs raised and flexed, the frame at the head end having at least two vertical pipes (**28**, **29**, **23**, **24**) on each side of the longitudinal midline of the table as supports for the patient's hands, at least one of said pipes having a vertically adjustable holder (**30**) for securing a longitudinally adjustable traction strap (**31**), which comprises a dynamometer (**35**, **35***a* and **35***b*) which measures the traction force and gives the traction strap suitable elasticity for auto-treatment, whereby the patient can choose the traction force he himself produces by his own muscular exertion when pulling and pressing against the respective pipe frames.

4,002,166
BYPASSED SCUBA REGULATOR
Bill N. Oliver, Huntington Beach, Calif., assignor to AMF Incorporated, White Plains, N.Y.
Filed Apr. 23, 1975, Ser. No. 570,755
Int. Cl.² A62B *7/04*
U.S. Cl. 128—142.2 **1 Claim**



1. In a scuba second stage regulator comprising a regulator control chamber, a flexible diaphragm at one end of said chamber, a mouthpiece tube at another end of said chamber, and an air supply connected to a side of said chamber, said air supply including an air valve, and a demand lever in said chamber which is connected to said valve and in engagement with said diaphragm to be adapted to be actuated by said

diaphragm to open and close said valve; the improvement of an air bypass tube extending from said air supply to said mouthpiece tube to bypass the incoming air from said air supply around said control chamber, and said bypass tube having a tangential connection with said mouthpiece tube, and an adjustable air baffle positioned inside said mouthpiece tube, said baffle extending lengthwise of said mouthpiece tube and positioned opposite to said tangential connection at an obtuse angle with respect to the longitudinal axis of said tangential connection; said baffle divergently inclined towards the mouthpiece end of said tube.

4,002,167

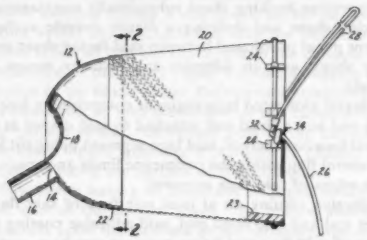
ANIMAL GAS MASK ASSEMBLY

George Phillip Rambosek, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 505,618, Sept. 13, 1974, abandoned. This application Feb. 20, 1976, Ser. No. 659,840

Int. Cl.² A61M *16/00*

U.S. Cl. 128—205 4 Claims



1. A gas mask assembly for snouted animals comprising:

a. means defining a rigid nose cap member for covering the nostrils and anterior portion of the animal's snout and having a generally circular marginal portion and means defining an opening in said nose cap member for the attachment of a breathing tube;

b. abutment means in said nose cap member for preventing the animal's nostrils from becoming occluded by said nose cap member, said abutment means comprising a member positioned symmetrical with respect to an axis through the center of the opening defined by said circular marginal portion of said nose cap and intersecting the center of the end of said nose cap and defining a surface spaced from the inner surfaces thereof;

c. a flexible sleeve member formed from substantially gas-impermeable material and shaped to fit around the animal's snout, said sleeve member being joined to the marginal portion of said nose cap member; and

d. immobilizing cinch means secured to the open end of said sleeve member and including a rope lock for securing and sealing said sleeve member to the animal's snout and for restraining the animal's head and allowing the cinch to tighten as the animal struggles against said immobilizing cinch means.

4,002,168

METHOD OF, AND DISPENSER FOR INTRODUCING AN OPTHALMIC PRODUCT INTO THE OCCULAR CAVITY

Tor Petterson, 31248 Palos Verdes Drive West, palos Verdes Penn., Calif. 90274

Filed Apr. 24, 1975, Ser. No. 571,294

Int. Cl.² A61M *31/00*

U.S. Cl. 128—233 18 Claims

1. The method of introducing an ophthalmic product from a dispenser into an occular cavity whereby blinking is substantially eliminated and the dispensing orifice of the dispenser does not contact said occular cavity, said dispenser comprising a container having wall means defining a cavity for containing a product to be dispensed, a dispensing orifice positioned in said wall means and in fluid communication with said cavity, and pump means constructed and arranged with said cavity to develop sufficient internal pressure within said cavity to dispense product from said cavity through said orifice, and a generally ring-shaped positioning/guard means fixedly secured to said container means and generally encircling said dispensing orifice, said positioning/guard means being angularly displaced relative to the longitudinal axis of the container, said method including the steps of positively positioning the generally ring-shaped positioning/guard means of the dispenser around the occular cavity thereby anthropromeṭically locating the dispensing orifice relative to said occular cavity while maintaining the dispensing orifice free from interference with the normal line of sight and activating the pump means of said dispenser to dispense an effective amount of ophthalmic product into said occular cavity.

6. A dispenser suitable for introducing an ophthalmic product into the occular cavity comprising —

a. container means comprising

1. wall means defining a cavity for containment of the product to be dispensed;

2. a dispensing orifice positioned in said wall means and in fluid communication with said cavity; and

3. a pump means constructed and arranged with said cavity to develop sufficient internal pressure within said cavity to dispense product from said cavity through said orifice; and

b. a generally ring-shaped positioning/guard means fixedly secured to said container means and generally encircling said dispensing orifice wherein said positioning/guard means is angularly displaced relative to the longitudinal axis of the container means such that when said positioning/guard means is placed around the occular cavity said dispensing orifice can be anthropromeṭically located relative to the occular cavity while avoiding contact with said occular cavity and interference with the normal line of sight.

4,002,169

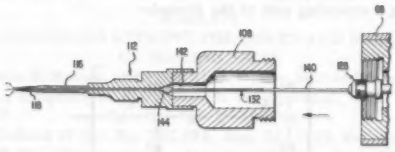
METHOD AND APPARATUS FOR PERFORMING SURGERY WITHOUT TISSUE INCISION

John A. Cupler, II, 10 Cupler Drive, LaVale, Cumberland, Md. 21502

Filed Apr. 18, 1972, Ser. No. 245,121

Int. Cl.² A61M *1/00, 7/00;* A61B *17/32;* A61F *9/00*

U.S. Cl. 128—276 4 Claims

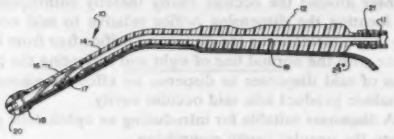


1. A method of removing cataracts, comprising; migrating a hollow needle into an organic eye and into the interior of the crystalline lens capsule containing a cataract; inserting a contractible and expansible masticating tool into said hollow needle in the contracted condition thereof; advancing the contracted masticating tool to the open end of the hollow needle in the interior of the crystalline lens capsule; advancing the masticating tool beyond the open end of the hollow needle and expanding the same within the crystalline lens capsule into masticating contact with the lens contents; rotating the expanded masticating tool and masticating the entire contents of the lens capsule including the cortex, nucleus and cataract while maintaining the structural integrity of the lens capsule; and withdrawing the masticated material through said hollow needle.

4,002,170
ANTICOAGULANT DELIVERY MEANS FOR ASPIRATION WAND

A. Boyd Hansen, and Gordon S. Reynolds, both of Bountiful, Utah, assignors to Sorenson Research Co., Inc., Salt Lake City, Utah

Continuation-in-part of Ser. No. 514,055, Oct. 11, 1974, Pat. No. 3,955,573. This application Aug. 25, 1975, Ser. No. 607,407
Int. Cl.² A61M *1/00*
U.S. Cl. 128—276 4 Claims



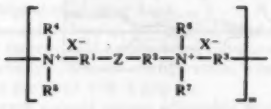
1. An anticoagulant delivery device for aspirating and treating blood during surgery comprising:
- a hollow conduit, the hollow of the conduit having a vacuum applied thereto and defining a pathway for the transport of aspirated blood;
- a perforated tip joined to the conduit and comprising a passageway facilitating aspiration of blood into the hollow of the conduit;
- a channel traversing an arcuate path and opening radially only into the hollow of the conduit in the vicinity of the tip; and
- means for delivering the anticoagulant into the channel at a point below the open side of the channel so as to insure flow of the anticoagulant around the arcuate path adjacent the internal surface of the hollow conduit.

4,002,171
WATER-DISPERSIBLE IONIC POLYURETHANE BINDER FOR NONWOVEN FABRICS

Arnold Jay Taft, East Brunswick, N.J., assignor to Personal Products Company, Milltown, N.J.

Filed Mar. 17, 1975, Ser. No. 558,989
Int. Cl.² A61F *13/16*; C07C *87/30*
U.S. Cl. 128—284 21 Claims

1. In a nonwoven fabric which comprises a web of substantially uniformly laid fibers and a polyurethane-based binder for said fibers distributed in said web, the improvement which comprises employing as said binder a cationic polyurethane having a repeating unit of the formula:

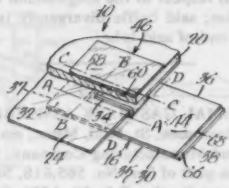


wherein R^1 and R^2 are selected from the group consisting of $-CH_2-$ and alkylene containing 2 to 4 carbon atoms, inclusive; Z is a linking condensation residue of a polyisocyanate with a polyol and contains at least four urethane linkages; R^3 is alkylene containing 2 to 4 carbon atoms, inclusive; R^4, R^5, R^6 and R^7 are lower alkyl containing 1 to 4 carbon atoms, inclusive; X is a halogen selected from the group consisting of chlorine and bromine, and *m* is an integer of sufficient magnitude to provide a polymer having a molecular weight sufficient to form a solid material; the equivalent weight of the polymer, expressed as the ratio of the molecular weight of the repeating unit divided by the number of N^+ in the repeating unit, being from about 500 to about 2000, whereby the nonwoven fabric is resistant to body fluids but dispersible in water.

4,002,172
DIAPER HAVING TAB FASTENER WITH CENTRAL FLAP

Mark I. Feldman, Chicago, Ill., assignor to Johnson & Johnson, N.J.

Filed Dec. 19, 1975, Ser. No. 642,284
Int. Cl.² A61F *13/16*; A41B *13/02*
U.S. Cl. 128—284 12 Claims



1. A disposable diaper having a facing sheet defining a diaper inside surface for direction toward an infant, a moisture-impervious backing sheet substantially coextensive with said facing sheet and defining a diaper outside surface, an absorbent panel positioned between said facing sheet and said backing sheet, and an adhesive tab fastener means which comprises:
- an integral elongated tape segment comprising a free working end and a fixed end attached to said diaper at a marginal location thereof, said tape segment being slit to form a central flap within the perimetric limits and spaced from the edges of said tape segment;
- an adhesive coating on at least one face of said flap, said free end and said fixed end, said adhesive coating on one face of said free end being pressure-sensitive; and
- release means for engagement with said adhesive coating on said free end;
- said fixed end being permanently attached to said backing sheet and said flap being permanently attached to said facing sheet by means of said adhesive coatings; and
- said free end being separable from said release means to make said adhesive-coated free end of said tape segment available for use in securing said diaper about an infant.

4,002,173
DIESTER CROSSLINKED POLYGLUCAN HYDROGELS AND RETICULATED SPONGES THEREOF

James H. Manning, Monroe, and John H. Stark, Campbell Hall, both of N.Y., assignors to International Paper Company, New York, N.Y.

Continuation-in-part of Ser. No. 490,968, July 23, 1974, abandoned. This application Apr. 14, 1975, Ser. No. 568,030
Int. Cl.² F23L *3/00*
U.S. Cl. 128—296 40 Claims

1. A hydrogel solid comprising diester crosslinked polyglucan selected from the class consisting of amylose, dextran and pullulan succinates and glutarates, said hydrogel solid being water-insoluble and the neutral pH sodium salt of which has a saline retention of isotonic saline solution sufficient to increase the weight of said hydrogel solid to an amount of between about 5 and 90 times its weight.

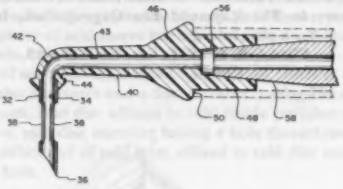
10. A hydrogel solid in accordance with claim 1, in the form of a reticulated porous sponge.

4,002,174

AIR EMBOLUS ASPIRATOR

Charles C. Reed; Denton A. Cooley, both of Houston, and Russell G. Sharp, Sugar Land, all of Tex., assignors to Texas Medical Products, Inc., Houston, Tex.

Filed Oct. 14, 1975, Ser. No. 621,922
Int. Cl.² A61B *17/34*; A61M *1/00*
U.S. Cl. 128—347 5 Claims



1. An air embolus aspirator comprising:

a hollow cannula having a sharpened tip for penetrating a blood vessel and a length less than the diameter of the blood vessel so that the full length of the cannula may be embedded in the blood vessel without damaging the underside of the blood vessel, the cannula presenting means for admitting air into the hollow of the cannula comprising radially spaced, elongated slots in the cannula, said admitting means spanning a plurality of radially spaced locations along the surface of the cannula;

a hollow shank having an annularly enlarged shoulder at a first end of the hollow shank, the hollow shank being mounted upon the cannula at the shoulder, the shoulder limiting the distance of penetration of the cannula, the hollow shank forming an angle of about 90° to the cannula at the shoulder so that the hollow shank will repose essentially flat against the penetrated surface while the cannula is projected transverse to the path of blood flow in the blood vessel thereby permitting rotation of said cannula about its longitudinal axis, the hollow of the shank communicating with the interior of the cannula and the shank defining an angular fluid path of about 90° between the cannula and the hollow shank; and

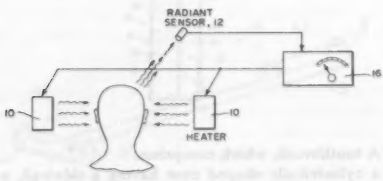
a hub mounted upon the shank and comprising means for coupling the aspirator to a source of reduced pressure to thereby aspirate away any air embolus in the vicinity of the cannula.

4,002,175

METHOD AND APPARATUS FOR CORTICAL THERMAL THERAPY

David M. Brainard, and Edward C. Brainard, II, both of Marion, Mass., assignors to Environmental Devices Corporation, Marion, Mass.

Filed June 25, 1975, Ser. No. 590,099
Int. Cl.² A61F *7/00*
U.S. Cl. 128—399 9 Claims



1. Cortical temperature — elevating apparatus for imposing a selected elevated body-differential cortical temperature to a person, said apparatus comprising

A. controllable thermal means for the localized heatinhg of the head of a person,

B. sensor means for sensing the temperature of the person's head, and

C. control means connected with said sensor means to receive a temperature-responsive signal and controlling in response thereto said thermal means to apply a temperature selected from the range between 38° and 50° C to the person's head, with a maximum rate of temperature increase below 1.0° C per minute.

8. A method for enhancing human cerebral functioning comprising the steps of

A. selectively elevating the cortical temperature by imposing a selected elevated body-differential temperature to the person's head,

B. monitoring the head temperature during at least the interval of said temperature-elevation, and

C. controlling the elevation of the head temperature in response to said monitoring to a temperature selected from the range between 38° C and 50° C, and controlling the rate of temperature increase to be less than 0.8° C per minute.

4,002,176

TOBACCO BASED SMOKING MATERIAL

Robert Craig Anderson, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 332,115, Feb. 13, 1973, abandoned. This application Aug. 13, 1974, Ser. No. 497,036
Int. Cl.² A24B *3/12*, *15/00*
U.S. Cl. 131—2 18 Claims

1. A process for the manufacture of an improved material suitable for smoking mixtures, comprising subjecting tobacco to a catalyzed degradation process at a temperature between about 100° to about 300° C until the weight of degraded material is less than 90% but not less than about 70% of the weight of the original tobacco, wherein said catalyzed degradation is carried out in the presence of a catalyst which accelerates the thermal degradation of said tobacco or lowers the thermal degradation temperature, said catalyst selected from the group consisting of strong acids, salts of strong acids with weak bases, alkali salts of weak acids and alkali hydroxides whereby the degraded tobacco material possesses enhanced tobacco flavour as compared to untreated tobacco.

4,002,177

MICROPOROUS STYRENE POLYMERS AND METHOD OF MAKING SAME

Norman B. Rainer, and Peter Allen Wilson, both of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.

Division of Ser. No. 282,481, Aug. 21, 1972, Pat. No. 3,887,730. This application Mar. 6, 1975, Ser. No. 555,988
Int. Cl.² A24B *15/00*
U.S. Cl. 131—10 R 2 Claims

1. A tobacco product comprising a tobacco section and a filter section, said filter section comprising a microporous styrene polymer having a randomly interconnected open network of irregularly shaped pores having their walls defined by cohered spherical particles, an average pore size of less than about 20 microns and a pore volume of at least about 1 cubic centimeter per gram, said polymer being in the form of ciliated granules and having a mesh size of from about 40 to about 80 and said filter section being capable of removing 65 per cent of the total particulate material contained in tobacco smoke passing therethrough at a resistance to draw of the tobacco product of about 5 inches of water and said filter section being found characterized by the substantial absence of any bonding agents.

4,002,178
FOAMS AND SPONGE SHEET FOR CIGAR MANUFACTURE

Joseph V. Fiore; T. Kenneth Kelly, both of Fairfield, Conn., and William J. Nellen, Richmond, Va., assignors to AMF Incorporated, White Plains, N.Y.

Division of Ser. No. 428,959, Dec. 27, 1973, Pat. No. 3,872,871. This application Oct. 29, 1974, Ser. No. 518,446
Int. Cl.² A24D *1/02*; A24B *3/14*
U.S. Cl. 131—15 R **10 Claims**

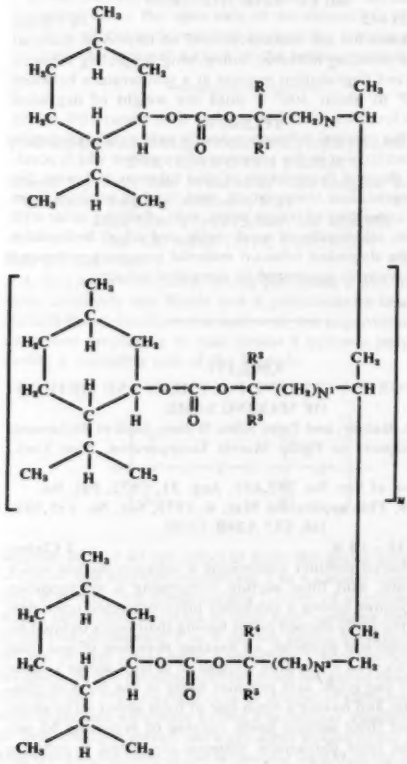
1. A stable foam comprising a reconstituted tobacco composition incorporating finely divided cigar tobacco and uniformly dispersed throughout said composition, a multiplicity of fine bubbles, at least 80% of the bubbles being less than about 100 microns in dimension, said bubbles acting to uniformly reduce the density of said composition.

4,002,179
SMOKING COMPOSITIONS INCORPORATING A MENTHOL-RELEASE AGENT

Eric G. S. Rundberg, Jr.; William R. Johnson, Jr., and Harvey J. Grubbs, all of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.

Division of Ser. No. 384,048, July 30, 1973, Pat. No. 3,887,603. This application Mar. 18, 1975, Ser. No. 559,574
Int. Cl.² A24B *3/14*
U.S. Cl. 131—17 A **10 Claims**

1. A smoking composition comprising an admixture of a natural or reconstituted tobacco with from about 1 to about 10%, based on the tobacco, of menthol-release agent having the chemical formula:



wherein:

N, N^3 and each N^1 have values of from 0 to 8;

R, R^1, R^4, R^5 and each R^2 and R^3 are each selected from the group consisting of alkyl having from 1 to 6 carbons, cycloalkyl having from 5 to 10 carbons and aromatic carbocyclic having from 6 to 10 carbons; and M has a value of from 0 to 98.

4,002,180
HAIR CURLER

Eugene C. Maier, and Lila M. Maier, both of Moscow, Idaho, assignors to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Oct. 6, 1975, Ser. No. 619,643
Int. Cl.² A45D *2/02*
U.S. Cl. 132—39 **1 Claim**

1. A hair curler, comprising

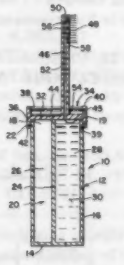
a support member of substantially pliable material for supporting hair wound around it, said support member being of substantially elongated unitary cylindrical configuration having a substantially smooth cylindrical surface and a pair of spaced opposite ends; and

a ribbon type member extending from one of the ends of the support member for wrapping around hair wound around said support member thereby holding the hair in position on said support member.

4,002,181
TRAVELING DENTURE TOOTHBRUSH DEVICE

Richard Rivera, Vallejo, Calif., assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed Aug. 4, 1975, Ser. No. 601,620
Int. Cl.² A45D *44/18*
U.S. Cl. 132—84 D **3 Claims**



1. A toothbrush, which comprises:

a. a cylindrically shaped case having a sidewall, a closed base, an open top end and an interior chamber therein;

b. a longitudinal intermediate wall contained in said interior chamber, said intermediate wall dividing said chamber into a left and a right compartment;

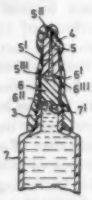
c. an annular lip contained on an outside periphery of said sidewall at said top end thereof;
d. an elongated stem;
e. a plurality of bristles affixed at one end of said stem, said stem having a bore extending from another end of said stem to a bristle portion of said stem, and said stem having a plurality of openings extending between said bore and an upper surface of said stem within said bristles; and
f. a cap member detachably affixing to said top end of said case, said other end of said stem affixed to said cap, said cap including a cylindrically shaped sleeve, an inside periphery of said sleeve having a pair of annular apertures therein, one said annular aperture disposed towards each end of said sleeve, said lip engaging into either of said two annular apertures and a disc member having a hole therethrough, said disc affixed to said inside periphery of said sleeve, said disc member having a hole therethrough, and said other end of said stem affixed to said disc member at said hole.

4,002,182

DEVICE FOR STORING AND APPLYING COSMETICS

Aubrey Jonathan Michel, Treetops, Mount Park Road, Harrow-on-the-Hill, Middlesex, England

Filed Oct. 9, 1975, Ser. No. 621,191
Claims priority, application United Kingdom, Oct. 9, 1974, 43766/74
Int. Cl.² A45D *40/26*
U.S. Cl. 132—88.7 **1 Claim**



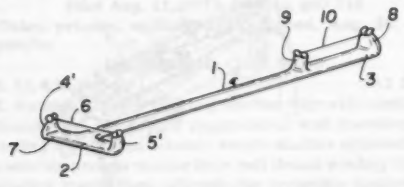
1. Container for flowable material and cap therefor characterised in that a body is provided near the container mouth partially plugging said mouth so that cosmetic material can only flow through a peripheral space between the body and the container wall and in that the cap has a shoulder which, when the cap is in position on the container, presses the container wall inwards, closing or restricting said peripheral space to prevent leakage of cosmetic material.

4,002,183

PLAQUE REMOVING DEVICE

Raymond B. Restall, Kamloops, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Sept. 8, 1975, Ser. No. 611,564
Int. Cl.² A61C *15/06*
U.S. Cl. 132—91 **1 Claim**



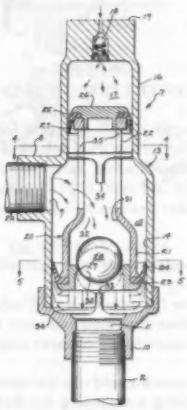
1. A plaque removing device, comprising
a substantially elongated linear handle having spaced opposite ends, the handle having an arm part extending at substantially right angles thereto in substantially T-configuration from one end thereof and a first pair of protruding parts extending from said arm part substantially colinearly with said arm part, in spaced relation;
a second pair of protruding parts extending from the handle at the other end thereof substantially colinearly therewith in spaced substantially parallel relation, the first and second pairs of protruding parts being substantially parallel to each other; and
dental floss releasably affixed to the first pair of protruding parts and extending substantially tautly therebetween and to the second pair of protruding parts and extending substantially tautly therebetween.

4,002,184

WATER FLOW ACTUATED AIR CHARGING DEVICE

Howard A. Tubbs, 406 S. Elizabeth St., Whitewater, Wis. 53190, and Donald M. Waltz, 1501 Roosevelt Drive, Atlantic, Iowa 50022

Filed Sept. 2, 1975, Ser. No. 609,287
Int. Cl.² F04F *1/00*
U.S. Cl. 137—211 **4 Claims**



1. In a fluid pressure system, the combination comprising:
a. a tank for storing liquid under pressure,
b. a pump for supplying liquid to said tank,
c. a first liquid conduit connected to said pump and with said conduit having a use facility valve connected thereto,
d. a second liquid conduit connected to said tank,
e. and automatic air charging means connected between said first and second conduits, said air charging means comprising:
1. an elongated housing providing inner and outer chambers and with said inner chamber being connected through said first conduit to said tank,
2. a one way air valve connected to the outer end portion of said outer chamber,
3. a plunger disposed for longitudinal sliding movement in said housing and extending between said chambers, the interior of said plunger providing a connection for liquid flow through said second conduit,
4. longitudinally spaced inner and outer valve seat means disposed within the inner end portion of said plunger,
5. and a longitudinally movable valve member disposed in said inner end portion of said plunger and confined between said seat means and freely movable therebetween,
6. said valve member being movably responsive to liquid flow from said tank into said plunger toward said use facility valve when the latter is opened to thereby engage said inner seat means and move said plunger

longitudinally inwardly so that air will be drawn into said outer chamber through said one way valve,

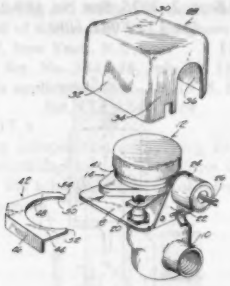
7. said valve member also being movably responsive to liquid flow from said pump into said plunger toward said tank when the pump is actuated to thereby engage said outer seat means and move said plunger longitudinally outwardly so that air in said outer chamber will be compressed and discharged into the liquid flowing into said tank through said second conduit.

4,002,185

MOTOR OPERATED VALVE UNIT WITH HEAT DISSIPATING CLIP MEMBER

Harry C. Konczal, Milwaukee, Wis., assignor to Erie Manufacturing Company, Milwaukee, Wis.

Filed Oct. 24, 1975, Ser. No. 625,633
Int. Cl.² F16K *49/00*
U.S. Cl. 137—338 **6 Claims**



1. A motor operated valve unit comprising:

a fluid valve unit;

an electric motor for actuating said valve unit;

a drive mechanism mounted between said valve unit and said motor to operatively connect said motor to said valve unit;

an enclosure means for said electric motor and drive mechanism comprising a mounting bracket and a cover member; and

a heat dissipating member of metal material having a first portion thereof positioned in contact with said motor and a second portion thereof positioned in contact with said cover member, said first portion of said heat dissipating member including a curved edge having a diameter which conforms to the outside diameter of said motor and is in contact therewith, said heat dissipating member serving to conduct heat from said motor to said cover member.

4,002,186

QUICK DISCONNECT COUPLING

David O. Fink, and Stanley R. McCrary, both of Bremerton, Wash., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 10, 1975, Ser. No. 622,274
Int. Cl.² F16L *29/00, 37/28*
U.S. Cl. 137—614.03 **3 Claims**

1. A quick disconnect coupling comprising:

a. a female section and a male section;

b. said female section including a cylindrical member, a fitting member, a rotatable nut and a spring loaded valve;

c. said cylindrical member having a first section at one end and a second section at the other end;

d. said first section including an interior cylindrical surface and an adjacent flange;

e. said fitting member including an exterior cylindrical surface and an adjacent flange;

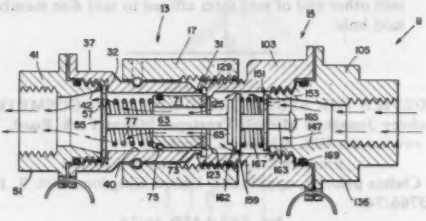
f. said interior cylindrical surface having a larger diameter than said exterior cylindrical surface and being positioned exterior of and co-extensive with respect to said exterior cylindrical surface;

g. a cylindrical groove formed inwardly from said exterior cylinder surface and positioned a predetermined distance from the flange of said fitting member;

h. a circular seal positioned in said groove and slidably engaging said interior cylindrical surface;

i. said second section of said cylindrical member including an exterior cylindrical surface, an interior cylindrical surface, and a circular shoulder depending from the end of said second section, said circular shoulder having a diameter that is less than the diameter of said second exterior surface of said second section;

j. said rotatable nut including an interior cylindrical surface at one end and female threads at the other end, a first



cylindrical bearing race formed outwardly from said interior cylindrical surface of said rotatable nut, said cylindrical member having a second cylindrical bearing race formed inwardly from said second exterior cylindrical surface, said first and second bearing races being adjacent and filled with bearing balls, said interior cylindrical surface of said rotatable nut having a diameter of from about 1 to 5 thousandths of an inch greater than said exterior cylindrical surface of said second section;

k. said spring loaded valve including a cylindrical seal, said valve being positioned within said cylindrical member and having said seal in slidable engagement with said interior cylindrical surface of said second section;

l. said male member including a circular seal for engaging said circular shoulder; and

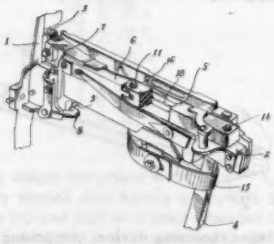
m. means for engaging said female section and said male section.

4,002,187

FLY SHUTTLE LOOM SHUTTLE BOX

Joseph E. Stahl, Easthampton, and William J. Hanson, Stow, both of Mass., assignors to J. P. Stevens & Co., Inc., New York, N.Y.

Continuation-in-part of Ser. No. 507,083, Sept. 18, 1974, abandoned. This application May 27, 1975, Ser. No. 581,213
Int. Cl.² D03D *49/54*
U.S. Cl. 139—185 **4 Claims**



1. An improved binder for each shuttle box of fly looms,

each binder comprising a leather lining, substantially solid, not significantly compressible high flex life elastomer, each binder being fastened to its respective shuttle box at both ends and positioned so as to encounter the shuttle on entering and while in the shuttle boxes, the elastomer binder being insufficiently compressible to operate except by the bowing out of the binder as the shuttle proceeds in the box, the only significant force decelerating the shuttle as it moves in the box being the force of bowing of the elastomer binder.

4,002,188

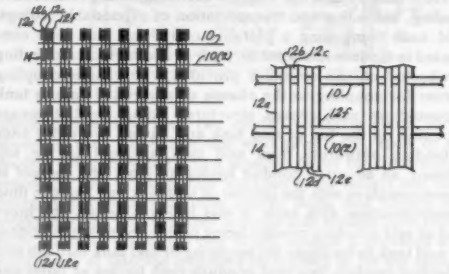
WOVEN SHADE SCREEN

Albert Hanks, Tuscaloosa, Ala., assignor to Phifer Wire Products, Inc., Tuscaloosa, Ala.

Filed Dec. 15, 1975, Ser. No. 640,868

Int. Cl.² D03D *1/00*

U.S. Cl. 139—420 R **3 Claims**



1. A woven shade screening fabric: a plurality of individual, spaced strands in parallel relationship in one direction of either the warp or fill of a woven fabric and comprising individual strands in substantially a uniform pattern, a plurality of groups of six substantially parallel individual strands closely associated in side-by-side relationship in the other direction of the fabric of the warp and fill from that of the preceding described uniform strands, said groups of strands being equally spaced to provide an open weave mesh pattern therebetween for the purpose of admitting some light and air while blocking some of the glare and sunlight, and the strands in each of said groups being arranged one strand over and the next strand under in alternating interlocking relationship at the point of crossing each of the respective individual strands in the other direction whereby in each point of intersection some of said strands are over and some of said strands are under and the next successive crossing of groups of strands alternate from the preceding one, each of the next successive strands alternating from over to under at each intersection and then alternating from under to over at the next intersection.

4,002,189

APPARATUS FOR SELECTING SHUTTLES WITH WEFT WINDINGS OF DIFFERENT YARN TYPES

Alois Steiner, Rieden, and Edgar Strauss, Ruti, both of Switzerland, assignors to Ruti Machinery Works Ltd., Ruti, Switzerland

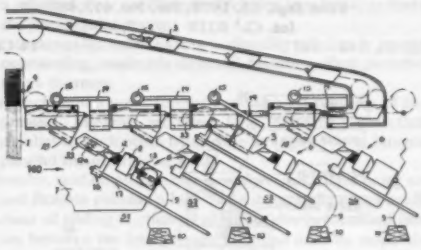
Filed Aug. 11, 1975, Ser. No. 603,515

Claims priority, application Switzerland, Aug. 26, 1974, 11608/74

Int. Cl.³ D03D *47/26, 45/00*

U.S. Cl. 139—436 **12 Claims**

1. An apparatus for selecting shuttles with weft windings of different yarn types for a programmed weft insertion on a travelling wave loom, wherein empty shuttles removed from the weaving process receive their weft thread winding through a winding mechanism, wherein the apparatus comprises a plurality of stations arranged in the zone of weft insertion of the travelling wave loom, each station having one winding mechanism and wherein at each station actuating members are operatively connected to a programme control device for the selective insertion into the weaving process of one of the shuttles prepared on the winding mechanism of one of the



stations and for the at least approximately simultaneous removal of an empty shuttle from the path of the shuttles and supplying it to the particular winding mechanism.

4,002,190

DEVICE FOR DEPOSITING WEFT THREAD SUPPLIES IN JET LOOMS

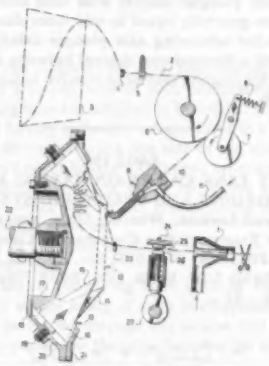
Zdenek Sevcik, Brno; Miroslav Bucek, Brnenske Ivanice, and Jindrich Henzl, Brno, all of Czechoslovakia, assignors to Vyzkumny a vyvojovy ustav, Brno, Czechoslovakia

Filed Nov. 17, 1975, Ser. No. 632,859

Claims priority, application Czechoslovakia, Nov. 15, 1974, 7782/74

Int. Cl.² D03D *47/36*

U.S. Cl. 139—452 **4 Claims**



1. A device for depositing weft thread supply for weaving machines having feeding and withdrawing mechanisms for the thread, said device being arranged between the feeding and withdrawing means and comprising an inserter, a magazine in the shape of a body of revolution, a plurality of uniformly arranged ribs projecting towards the axis of said body of revolution and being mounted thereon, said ribs defining gaps therebetween, said inserter being adapted to deposit said thread in said magazine so as to extend across opposite edges of said ribs and into said gaps between adjacent ribs and means for relatively rotatably driving the said magazine and inserter.

4,002,191

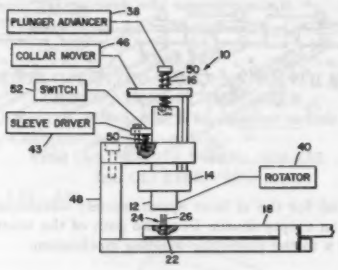
APPARATUS AND METHOD FOR STRAIGHTENING SEMI-CONDUCTOR PINS

Gianni Lorenzini, 1049 Oregon Ave., Palo Alto, Calif. 94303

Filed Sept. 15, 1975, Ser. No. 613,497

Int. Cl.² B21F *1/02, 7/00*

U.S. Cl. 140—147 **14 Claims**



1. Apparatus for parallel alignment of a plurality of stiff bendable pins each proceeding generally in the same direction from a common head, comprising:

1. Means for holding a head having a plurality of stiff bendable generally equally spaced pins each attached to a base end thereof to extend from said head generally in one direction to a free end thereof, the base ends of said pins defining a circular ring having an inner and an outer diameter and an axis;
2. Means for preventing said pins from separating from one another beyond a cylindrical volume defined by said outer diameter and said axis;
3. A plurality of pistons in one to one relation with said plurality of pins generally perpendicular to said pins, each piston aiming towards said axis;
4. Means for inserting said pistons, one between each of adjacent of said pins towards said axis;
5. A round plunger coaxial with said axis and having a diameter generally equal to said inner diameter;
6. Means for advancing said plunger axially towards said ring with a forward end thereof between said pins; and
7. Means for rotating said head relative to said pistons about said axis.

4,002,192

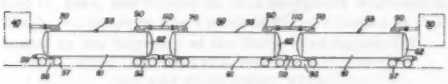
RAILWAY TANK CAR TRAIN HAVING A TWO-WAY LOADING AND UNLOADING SYSTEM

Erling Mowatt-Larssen, Warren, Ohio, assignor to General American Transportation Corporation, Chicago, Ill.

Filed May 30, 1975, Ser. No. 582,197

Int. Cl.² B61D *5/08;* **B65B** *3/04;* **E03B** *7/04;* **F17D** *1/12*

U.S. Cl. 141—35 **15 Claims**



1. A railway tank car for interconnection in fluid communication with associated tank cars by flexible connecting conduits for accommodating consecutive loading, unloading, and transportation of expandable ladings, said tank car comprising a wheeled chassis structure provided with chassis coupling means for coupling to the chassis of associated cars, a tank mounted on said chassis structure, lading conduit means mounted on the top of said tank and having two outer ends extending outwardly from said tank adjacent to the top thereof, an eduction conduit having an outer end in fluid communication with said lading conduit means and having an inner end in fluid communication with the interior of said tank, the inner end of said eduction conduit being positioned near the bottom of said tank to facilitate the emptying of said tank through said eduction conduit, two vent conduits each having an outer end in fluid communication with said lading conduit means and having an inner end in fluid communication with the interior of said tank, the inner end of each of said vent conduits extending into said tank and terminating a predetermined distance below and near the top of said tank, and a plurality of valves for interrupting communication between said vent conduits and said lading conduit means and between said eduction conduit and said lading conduit means, whereby said tank may be loaded and unloaded from either end of said lading conduit means by adjustment of said valves to interrupt communication between the one end of said lading conduit means and the adjacent vent conduit and to interrupt communication between the other end of said conduit means and the eduction conduit.

15. A railway tank car train for accommodating consecutive loading, unloading and transportation of expandable ladings, said train comprising a plurality of railway tank cars connected in tandem relationship, each of said tank cars including a wheeled chassis structure provided with chassis coupling means for coupling to the chassis of associated cars, a tank mounted on said chassis structure, lading conduit means mounted on the top of said tank and having two outer ends extending outwardly from said tank adjacent to the top thereof, an eduction conduit having an inner end thereof in communication with the interior of said tank and being in fluid communication with each of said lading conduits, the inner end of said eduction conduit being positioned near the bottom of said tank to facilitate the emptying of said tank through said eduction conduit, two vent conduits each having an outer end in fluid communication with said lading conduits and an inner end in fluid communication with the interior of said tank, the inner end of each of said vent conduits extending into said tank and terminating a predetermined distance below and near the top of said tank, a plurality of valves for interrupting communication between said vent conduits and said lading conduit means and between said eduction conduits and said lading conduit means, and conduit coupling means on each of said lading conduit means for coupling to an associated end of an associated flexible connecting conduit to place said tank in fluid communication with the tanks of adjacent-like tank cars, whereby said tank train may be loaded and unloaded from either end thereof by adjustment of said valves on each of said tank cars to interrupt communication between the individual ends of said lading conduit means and the adjacent vent conduits and to interrupt communication between the other ends of the lading conduit means and the adjacent eduction conduits.

4,002,193

CONTOUR-COPYING LATHE AND METHOD OF OPERATING SAME WITH PRESHAPED WORKPIECES

Erich Schmidt, Mauerbach, Austria, assignor to Maschinenfabrik Zuckermann Komm. Ges. Wien, Vienna, Austria

Continuation-in-part of Ser. No. 338,814, March 7, 1973, Pat. No. 3,863,691. This application Oct. 7, 1974, Ser. No. 512,607

Claims priority, application Austria, Oct. 9, 1973, 8571/73

Int. Cl.² B23Q *35/04;* **B23B** *3/28*

U.S. Cl. 142—7 **7 Claims**

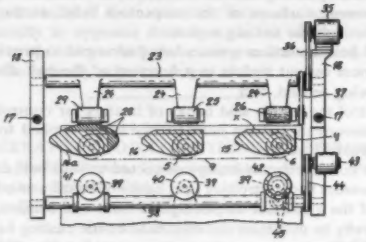
1. In a method of operating a copying lathe wherein a workpiece and a model are synchronously rotated about respective parallel axes and a feeler riding on and displaceable along the model is so linked to a sanding tool engageable with and similarly displaceable along the workpiece so that said tool closely follows said feeler to copy the contours of said model into said workpiece, the improvement comprising the steps of:

providing a model having extensions in regions corresponding to surfaces on said workpiece which are not to be shaped;

lifting said sanding tool from said workpiece by engagement of said feeler with said extensions; and

providing a secondary model having the exact shape desired for said workpiece and milling all of the contours of said secondary model in said workpiece in a first pass, then sanding said workpiece according to the shape of the primary model with lifting of said tool from said workpiece at said extensions.

3. In a copying lathe for producing elongated wood articles with a nonuniform configuration wherein at least one workpiece is rotatable about a longitudinal axis and is driven synchronously with at least two models rotatable about corresponding axes parallel to the workpiece axes, each of the models being provided with a separate feeler for controlling a respective tool to shape said workpiece, the feelers and tools being synchronously shiftable axially along said models and workpiece, the improvement wherein said models have essentially the same shapes but one of said models is provided with projections at selected locations therealong to lift the respective tool out of engagement with its workpiece at corresponding locations thereof.



4,002,194
SAFETY WALLET

Charles B. Wright, Sr., 311 N. Lindbergh, St. Louis, Mo. 63141

Filed Nov. 5, 1975, Ser. No. 628,725
Int. Cl.² A45C 1/06
U.S. Cl. 150—47 1 Claim

1. A safety wallet for retention in a fabric pocket having pocket side panels, the wallet comprising:

a pair of wallet sections connected to one another at a fold section;

each of said sections being generally rectangular in form and having an outer panel with an exposed surface and with side and end edges;

each of said exposed surfaces having a substantially rectangular area of a dimension such as to be closely adjacent the side and end edges of the respective sections and to substantially cover said sections;

the sections having rim portions surrounding the areas with a relatively low coefficient of friction in relation to that of the rectangular areas;

the rectangular areas having a plurality of closely spaced, outstanding, randomly directed, hirsute surface protuberances thereon;

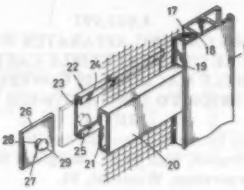
said rectangular areas further comprising a plurality of heat pressed, integral, indented lines extending essentially parallel to each other from edge to edge to form integral, parallel hirsute ridges;

whereby, said hirsute surface protuberance ridges being soft and flexible provide a high and substantially equal coefficient of sliding friction in all directions in localized fashion between the heat pressed indented lines on respective pocket side panels to prevent inadvertent loss of the wallet and to prevent unauthorized withdrawal of the wallet from the pocket.

4,002,195
MIDDLE RAIL ASSEMBLY FOR USE IN SCREEN DOORS AND SASHES

Mitsuo Nagase, Kurobe, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 3, 1976, Ser. No. 682,450
Claims priority, application Japan, May 12, 1975, 50-63524[U]
Int. Cl.² E06B 3/30
U.S. Cl. 160—379 4 Claims



1. A middle rail assembly for centrally clamping the screen in the frame of a screen door or sash, comprising:

a. a supporting member adapted to be held at its ends by the frame and having a plurality of apertures in a side thereof for being directed toward one side of the screen;

b. a middle rail cover having a C-shaped cross-section defining a channel extending along its length and opening toward the other side of the screen along the length of said supporting member;

c. a plurality of adjusting plates slidably snugly disposed in said channel; and

d. coupling means projecting from each of said adjusting plates, said means being of such configuration as to enable it to be forced through the screen and tightly into one said apertures for thereby clamping the screen therebetween.

4,002,196
METHOD FOR FORMING AN EQUALIZED LAYER TO A SHAPING SURFACE OF A MOLD

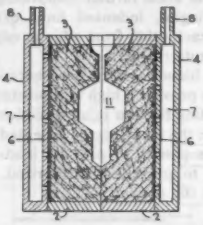
Katsutoshi Inadama, 537 Oaza-Sakurado, Koshoku, Japan (387)

Filed Jan. 11, 1974, Ser. No. 432,654
Int. Cl.² B22C 9/02
U.S. Cl. 164—7 6 Claims

1. A method for molding metal comprising the steps of:

forming an equalized layer onto a shaping surface of each of two complementary molds comprising the steps of: placing a mold flask on a pattern member having a surface of

the same shape as a casting; filling the flask with a filling material consisting of a heat resisting particulate material having a volatile binder, a shaping surface defining a cavity being formed in the filling material by the pattern member; setting an evacuation box on top of the flask; inverting the pattern member, the flask and the evacuation box; removing the pattern member from the flask; forming a sealing layer by applying a sealing material



having instant drying properties onto the shaping surface; evacuating the flask through the evacuation box to remove the volatile binder from the filling material and to draw the dryed sealing material to the filling material to prevent movement between the particles of filling material;

joining the two complementary molds so that the adjoining cavities of the molds form a larger cavity; and pouring a molten metal into the larger cavity.

4,002,197

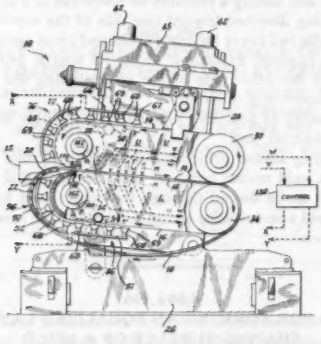
CONTINUOUS CASTING APPARATUS WHEREIN THE TEMPERATURE OF THE FLEXIBLE CASTING BELTS IN TWIN-BELT MACHINES IS CONTROLLABLY ELEVATED PRIOR TO CONTACT WITH THE MOLTEN METAL

Robert William Hazelett, Winooski, and John Frederick Barry Wood, Burlington, both of Vt., assignors to Hazelett Strip-Casting Corporation, Winooski, Vt.

Division of Ser. No. 414,237, Nov. 9, 1973, Pat. No. 3,937,270. This application Aug. 7, 1975, Ser. No. 602,579

Int. Cl.² B22D *27/02*

U.S. Cl. 164—250 **13 Claims**



4. In a twin-belt casting machine in which a casting region is defined between opposed portions of the front faces of a pair of revolving endless flexible casting belts and in which the molten metal to be cast is introduced into the casting region to be carried along between the front faces of the belts as it is being solidified, the invention comprising:

a plurality of banks of radiant heaters,

first support means mounting one of the banks of heaters closely adjacent to the front face of one of the casting belts in a position located before the revolving belt enters the casting region,

second support means mounting another of the banks of heaters closely adjacent to the front face of the other casting belt in a position located before the revolving belt enters the casting region,

said first and second support means aiming the banks of heaters to direct intensive radiant energy onto the front faces of the respective belts at close range for pre-heating the belts before they enter the casting region,

a plurality of belt distortion sensors positioned to engage the reverse surfaces of the respective belts, as they travel through the casting region,

said belt distortion sensors being arranged to provide electrical output signals as a function of the belt distortions being sensed, and

control means for said banks of heaters for controlling the amount of radiant heat energy being applied to the respective belts,

said control means being connected to said belt distortion sensors for controlling said banks of heaters as a function of the electrical output signals from said sensors,

thereby to minimize the distortion of the casting belts after they begin carrying the molten metal between them in the casting region.

4,002,198

FINNED TUBE HEAT EXCHANGER USED AS A DESUBLIMATOR FOR ISOLATING SUBLIMATION PRODUCTS, ESPECIALLY PHTHALIC ANHYDRIDE, FROM REACTION GASES

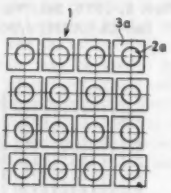
Joachim Wagner, Ludwigshafen, and Harry Kassat, Bochum, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Aug. 28, 1975, Ser. No. 608,626

Claims priority, application Germany, Sept. 5, 1974, 2442420

Int. Cl.² B01D *7/00*

U.S. Cl. 165—61 **9 Claims**



1. A finned tube heat exchanger used as a desublimator for isolating sublimation products, especially phthalic anhydride, from reaction gases, which consists of a housing with connections to permit the passage of the reaction gas and the discharge of the molten sublimation product, and of several rows, fitted one above the other, approximately horizontally, within the housing, of identical finned tube bundles, supported so that they can move independently of one another when undergoing thermal expansion or contraction, the bundles being intended alternately to be subjected, from the inside, to a heating medium and a coolant, especially a heat transfer oil, wherein the reaction gas travels, within the housing, transversely to the direction of flow of the heating medium and coolant in the tubes, and finned tube bundles, arranged parallel, above one another and optionally also alongside one another, consist of at least two rows of tubes, arranged above one another, which are connected to one another, at one end, by tube bends, to form a hairpin tube, and at the opposite end, the rows of tubes are connected, by means of a tube plate, to a collecting and distributor chamber for the heating medium or coolant, and the transverse fins mounted on the core tubes

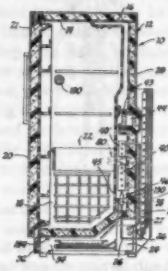
are staggered laterally in rows, in opposite directions, within each tube bundle, wherein each finned tube bundle (1) consists of four superposed rows of tubes, with the said superposed tubes (2, 2*a*, 2*b*) being aligned with one another relative to the direction of flow of the reaction gases, the tubes of the rows of tubes being connected to one another, by the common header (6), in such a way that the same stream of heating medium or coolant successively flows through the tubes or groups of tubes of the first and third row of tubes and of the second and fourth row of tubes and the transverse fins (3, 3*a*, 3*b*) fixed on the core tubes (2, 2*a*, 2*b*) being mounted on the latter eccentrically to the axes of the tubes and staggered in rows, laterally in opposite directions, by an amount corresponding to about from half the spacing to the whole spacing between the laterally adjacent edges of fins.

4,002,199

REFRIGERATOR FOOD CONDITIONING APPLIANCE

James W. Jacobs, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 10, 1975, Ser. No. 630,354
Int. Cl.² F25B *29/00*
U.S. Cl. 165—61 **4 Claims**



1. In a refrigerator, a cabinet having an insulated food storage compartment therein for storage of frozen foods, an evaporator cooling coil within said compartment having a vertically disposed air flue duct, an evaporator cooling coil within said duct, fan means in said air duct for forcibly circulating air in heat exchange transfer relation with said evaporator prior to the air being exited into said freezer compartment, an insulated food storage receptacle disposed in said compartment in a position such that said duct has an air outlet in communication with an air inlet in said receptacle, a reflective damper member pivotally mounted in said receptacle air inlet for controlling the flow of refrigerated air therethrough, infrared lamp means mounted in front of the reflective surface of said damper, selectable damper control means pivoting said damper member to a plurality of positions including a normal refrigerating position and a fast thawing position; said damper member operative in said refrigerating position closing said inlet and directing infrared radiation heat energy from said lamp means by reflective means in said duct onto said cooling coil during a defrost cycle, said damper member operative in said fast thaw position closing said inlet and directing infrared radiation heat energy from said lamp means into said receptacle to fast thaw food items placed therein.

4,002,200

EXTENDED FIN HEAT EXCHANGER PANEL

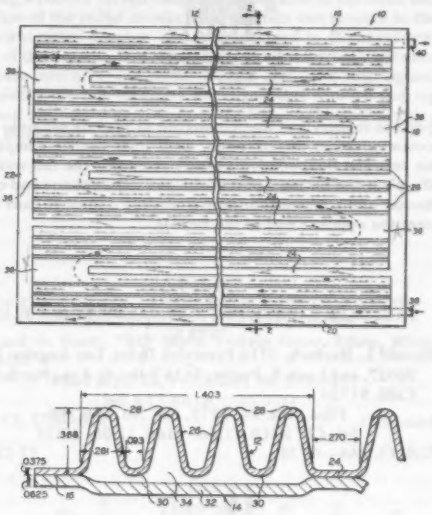
Walter Raskin, Brooklyn, N.Y., assignor to Dean Products, Inc., Brooklyn, N.Y.

Continuation of Ser. No. 313,180, Dec. 7, 1972, abandoned. This application Dec. 23, 1974, Ser. No. 535,505
Int. Cl.² F24H *3/00*; F28F *3/14*
U.S. Cl. 165—131 **4 Claims**

1. A heat exchange panel formed from two superimposed rectangular plates bonded together along their edges and having an inlet and an outlet for circulating the heat exchange medium;

a. one of said plates being corrugated to form groups of easily cleanable, smoothly rounded open-looped undulating fins having a reduced tendency to become fouled and intervening flat portions;

b. the other one of said plates being substantially flat and sealed to the flat portions of said corrugated plate forming together therewith sealed strips separating said groups of open-looped undulating fins and sealed strips extending alternately from one bonded edge to a distance spaced from the opposite bonded edge to form open unsealed portions permitting the heat exchange medium to pass in heat exchange relationship successively through



said groups of open-looped undulating fins in alternately reversed directions across the panel from the inlet to the outlet thereof;

c. said substantially flat plate having a depressed portion extending between each of said strips and being co-extensive in length with each of said groups of undulations and spaced from the undulations facing said depressed portions to provide direct prime heat exchange between the open-looped fins of each of said groups and expose virtually the entire inner heat exchange surface of the panel to such direct prime heat exchange contact with the medium therein and provide a panel having a heat capacity coefficient K of approximately 2.5 BTU per square foot of projected surface times the difference in temperature between the panel and the ambient air.

4,002,201

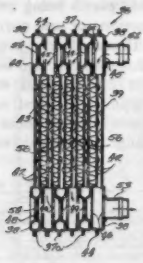
MULTIPLE FLUID STACKED PLATE HEAT EXCHANGER

Desmond M. Donaldson, Halton, Canada, assignor to Borg-Warner Corporation, Chicago, Ill.

Filed May 24, 1974, Ser. No. 473,254
Int. Cl.² F28F *3/08*
U.S. Cl. 165—140 **9 Claims**

1. A multiple fluid heat exchanger comprising a first set of self-contained plates and a second set of self-contained plates of substantially identical construction, the second set of plates being reversely arranged and interleaved with the first set of plates, each plate formed of a pair of oppositely disposed metal sheets of dished configuration joined along their periph-

eries to provide an upper and a lower fluid header and a core portion interconnecting said headers, said fluid headers of said interleaved plates being positioned in abutting sealed relation, said first set of plates having inlet and outlet ports in registry and interconnected to provide fluid communication therethrough and said second set of plates having inlet and outlet



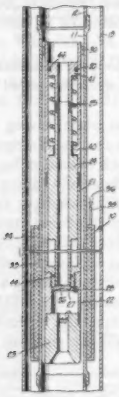
ports in registry and interconnected to provide separate fluid communication therethrough, each fluid header comprising an enlarged fluid conduit portion extending the full width of the plate and having a port positioned adjacent one end of the header and a recessed portion providing a through-port adjacent the opposite end of the header.

4,002,202

FAIL-SAFE SAFETY CUT-OFF VALVE FOR A FLUID WELL

Donald L. Huebsch, 3716 Prestwick Drive, Los Angeles, Calif. 90027, and Louis B. Paulos, 9616 Yolanda Ave., Northridge, Calif. 91324

Filed Sept. 24, 1975, Ser. No. 616,189
Int. Cl.² E21B *43/00*; F16K *31/06, 17/34*
U.S. Cl. 166—65 M **17 Claims**



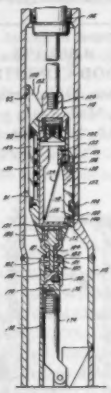
1. A fail-safe safety cut-off valve assembly suitable for use deeply submerged and supported coaxially of the tubing string of a fluid well comprising: an open-ended tubular housing of non-magnetic material forming a tubular portion of said tubing string and supporting a solenoid coil substantially embraced except on its interior side by magnetic material, a tubular armature of magnetic material mounted within said housing and reciprocal between extended and retracted positions axially of said tubular housing and of said solenoid coil and having cut-off valve means operatively associated therewith, spring means biasing said valve means closed and said armature to said extended position when said solenoid coil is de-energized, said solenoid coil, when energized, being effective to shift said armature to said retracted position and to open said cut-off valve, and means providing a fluid seal between the exterior of said armature and the interior of said tubular housing.

4,002,203

WELL INSTALLATION

Ben David Terral, Houston, Tex., assignor to Camco, Incorporated

Filed Sept. 8, 1975, Ser. No. 610,970
Int. Cl.² E21B *23/02*
U.S. Cl. 166—117.5 **12 Claims**



1. A well locator tool for coacting with a well sub positioned in a well tubing, said sub having an orientation sleeve having a downwardly extending guide surface on the top of the sleeve, an upwardly directed actuating shoulder on the sleeve, and a slot in the sleeve having a configuration of at least one ridge and one valley, said tool comprising,

a body having connection means for moving the tool through a well tubing and including means for supporting well apparatus,

actuating means including a finger movably connected to said body for longitudinal movement, and including a well apparatus actuator, said finger including a downwardly directed actuating shoulder for engaging the shoulder in the sleeve,

spring means yieldably urging said finger outwardly,

releasing means initially preventing longitudinal movement between the body and said finger but allowing movement after being released thereby allowing movement between said body and said actuator, and

means allowing but yieldably resisting longitudinal movement between the body and said finger whereby further longitudinal movement of the body, after the releasing means is released, may occur only after movement between said body and said actuator.

4,002,204

TIMING THE DEPOSITION OF AN ASPHALT PLUGGING MATERIAL FROM AN ASPHALT-CATIONIC EMULSION

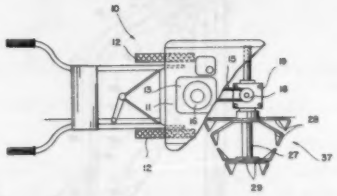
Daniel C. Cavin, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 13, 1975, Ser. No. 631,775
Int. Cl.² E21B *33/138*
U.S. Cl. 166—294 **11 Claims**

1. In a process in which a cationic emulsion that contains asphalt and a pH-increasing reactant is injected into a subterranean earth formation to plug the earth formation, the improvement comprising:

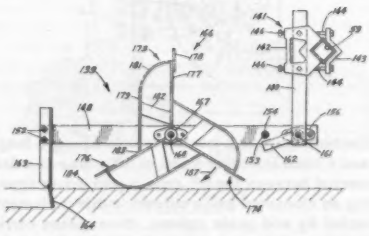
using, as the pH-increasing reactant, a mixture consisting essentially of urea and urease.

4,002,205
HORTICULTURAL DEVICE
David C. Falk, 4239 Avent Ferry Road, Raleigh, N.C. 27606
Filed Dec. 5, 1974, Ser. No. 529,738
Int. Cl.² A01D *35/00*; A01B *23/02*
U.S. Cl. 172—15 1 Claim



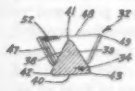
1. A horticultural device for establishing and maintaining the boundary between plant beds and ambient grassy areas comprising: a frame means; a plurality of wheel type means for supporting said frame means relative to a surface of the earth to be transversed; handle means secured to said frame means for user controlling the said horticultural device during traverse; means for causing said supported frame means to traverse said surface; power drive means carried by said frame means for imparting a rotative motion to a shaft means, said shaft being disposed generally parallel to said surface and perpendicular to the direction of traverse; and significantly spaced apart first and second sets of pluralities of elongated earth cutting and scattering blades mounted on one end of said shaft means, each of said sets having outer tips which are so angled that, as such blades rotate with said shaft means, said shaft forms the axis of a generally frustroconical shaped cutting swath, and at least one of the angled tips of each set of blades being disposed toward the other set whereby, as the edge of said cutting swath engages the earth, a wedge-shaped-in-cross-section trench will be cut and the dirt therefrom impelled and scattered toward the small end of said frustrocone thereby establishing a neat, clear-cut eye pleasing demarcation boundary.

4,002,206
DITCHER
Fred W. Eisenhardt, Fargo, N. Dak., assignor to Alloway Manufacturing, Inc., Fargo, N. Dak.
Division of Ser. No. 474,048, May 28, 1974, abandoned. This application Apr. 3, 1975, Ser. No. 564,829
Int. Cl.² A01B *35/32*
U.S. Cl. 172—90 27 Claims



24. An earthworking implement for making separate trenches in the soil comprising: a frame unit having laterally spaced side members, said side members having forward ends and rear ends, an upright support, means pivotally mounting the forward ends of the side members to the lower portion of the support whereby the frame units can sequentially pivot up and down in a generally vertical direction, earthworking tool means secured to the frame unit for forming separate trenches in the soil, wheel means for sequentially moving the frame unit and tool means up and down in a generally vertical direction to make separate trenches in the soil when the implement is moved in a forward direction, means rotatably mounting the wheel means on the frame unit between the ends thereof for rotation about a horizontal transverse axis, said wheel means having a center hub rotatably mounted on the side members between the ends thereof, a plurality of radial members secured to the hub, soil penetrating means being secured to the outer ends of each radial member, and a back member located behind each radial member for limiting the amount of penetration of the soil penetrating means, each back member having a convex curved outer section secured to the outer end portion of the radial member and an inner end secured to the adjacent radial member, a stop leg secured to the lower portion of the support, said stop leg extended rearwardly between the side members, and means located above the stop leg and secured to the side members and engageable with the stop leg to limit downward movement of the frame unit, earthworking tool means and wheel means.

4,002,207
EARTHWORKING TOOL WITH HANDLE HAVING TRIANGULARLY ARRANGED SIDES
Richard O. Bartz, 7017 Mark Terrace Drive, Edina, Minn. 55435
Filed Sept. 18, 1975, Ser. No. 614,507
Int. Cl.² A01B *1/04*, *1/14*
U.S. Cl. 172—378 14 Claims



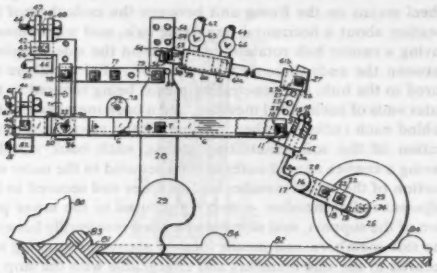
11. An earthworking tool comprising: an elongated handle having a longitudinally elongated midsection having a first end and a second end, said midsection having outside first, second and third flat linear sides, said sides being located in a general triangular arrangement relative to each other whereby the midsection can be gripped with the first and second finger and thumb of the hand for manipulating the tool, said midsection of the handle having a longitudinal rib extended along the top of the handle, and a neck portion having a first end and a second end, said first end of the neck portion being attached to the second end of the midsection, said neck portion having first, second and third sides located in general triangular arrangement which extend in such configuration along substantially the entire length of the neck portion, said neck portion tapering inwardly along substantially its entire length in the direction away from said second end of the midsection, and means for working the soil attached to the second end of the neck portion.

4,002,208

PLOWING AND LEVEE CUTTING DEVICE

Adam Rougeau, 8670 Newfield Lane, Beaumont, Tex. 77707

Filed Mar. 12, 1975, Ser. No. 557,466
Int. Cl.² A01B 3/24, 13/00, 63/22, 63/32
U.S. Cl. 172—398 5 Claims



5. A plowing and levee cutting device connected to the rear end of a tractor and having a horizontal frame to which is pivotally connected a vertical plow shank with a plow blade point on its lower end and trailing roller wheel pivotally mounted adjacent the lower bent end of a turning pin which swivels through the lower end of a crank arm that is pivotally mounted on a pivot pin connected adjacent the rear end of said frame, said crank arm having a vertically disposed upper portion the lower end of which is pivotally connected to the rear end of a piston rod, a cylinder having a chamber therein, a piston movable in said cylinder chamber and connected to the forward end of said piston rod, the forward end of said cylinder rigidly connected to the upper end of said vertically disposed plow shank, a vertical post forward of the upper end of said plow shank, the upper ends of said post and plow shank pivotally connected together by a link arm, a hydraulically controlled piston rod extending rearwardly from said tractor with the rear end of said controlled piston rod attached to an upper hitch which is attached to the upper end of said post to keep said post, pivotal link arm and upper plow shank in rigid positions during the plowing opertion after the plow point blade and trailing wheel have been set at desired lowered positions for plowing, operating fluid under pressure introduced through a pipe and a regulating valve into said first named cylinder chamber rearward of said piston therein that extends between the upper ends of said plow shank and said crank arm to move said first named piston rearwardly to pull the upper end of said crank arm forwardly and simultaneously lift said plow point and roller wheel above ground level at desired inoperative position, a transporting bar, the upper end of said bar rigidly attached to said post and the lower end of said bar is rigidly attached to said frame and angularly disposed thereto to hold all pivotal connections on said device in rigid alignment so that when said device is lifted upwardly from the ground as a unit by tractor hydraulic lifting means whereby said device may be safely transported from one location to another location by said tractor, and upon removing said bar from said device said device may again be put into operative position.

4,002,209

SOIL WORKING TINES AND THEIR MOUNTING

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Mar. 6, 1975, Ser. No. 556,148
Claims priority, application Netherlands, Mar. 7, 1974, 7403071
Int. Cl.² A01B 33/14
U.S. Cl. 172—762 21 Claims

20. A tine and mounting combination for a rotary harrow, said mounting being rotatable about an upwardly extending axis and comprising a holder with an upwardly extending bore that receives an upper fastening portion of said tine, said bore and fastening portion extending through said holder and said bore having a longitudinal axis that substantially intersects said axis of rotation at an acute angle that opens downwardly towards the ground when viewed from aside, said mounting being connected to a shaft that defines said axis of rotation,

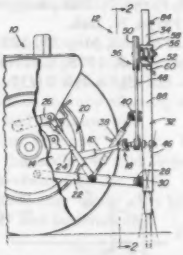
said fastening portion being connected to a soil-working portion that includes an elongated lower straight region and an elongated upper straight region, said regions being interconnected by an integral bend, said upper region extending in the same direction as said fastening portion and said lower region extending substantially parallel to said shaft.

4,002,210

FRICTION WHEEL ACTUATED POST DRIVER

Charles R. White, R.F.D., Calhoun City, Miss. 38916

Filed Aug. 28, 1975, Ser. No. 608,738
Int. Cl.² E21B 1/00
U.S. Cl. 173—26 8 Claims



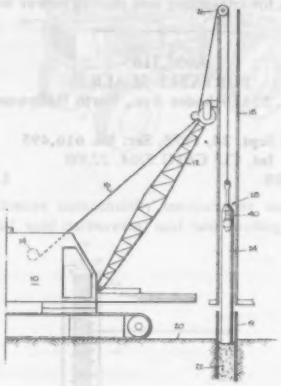
2. In combination with a tractor vehicle having a longitudinal axis and a hitch including a pair of lift arms and a drawbar interconnected between the lift arms, a post driver apparatus, comprising an elongated guide column, a driver element slidably mounted by said guide column, drive means carried by the guide column for upwardly displacing the driver element along an adjusted vertical direction of travel intersecting said longitudinal axis, and adjustable support means connecting the guide column to the drawbar between said lift arms for angularly adjusting said adjusted vertical direction of travel relative to the longitudinal axis.

4,002,211

CABLE OPERATED APPARATUS FOR FORMING PILES

Henry A. Nelson Holland, Houston, Tex., assignor to Raymond International Inc., Houston, Tex.

Filed Sept. 19, 1974, Ser. No. 507,613
Int. Cl. E02D 7/08
U.S. Cl. 173—87 15 Claims



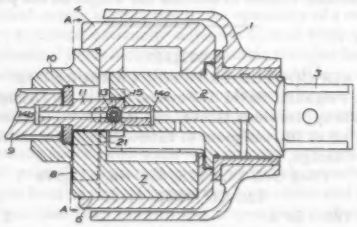
1. A pile hammer rig comprising, a crane, a hoisting drum carried by said crane, driving means and braking means for said drum, a drop-weight, a hoisting rope leading from said drum for lifting said drop-weight, a device for connecting said hoisting rope to said drop-weight including a rod and plunger piston assembly connected to said rope, means for connecting said rod and plunger piston assembly to the upper end of said drop-weight for movement between an upper position and a lower position with respect to said drop-weight, means for absorbing shock of said rod and plunger piston assembly when it approaches its upper position, and means for absorbing shock of said rod and plunger piston assembly when it approaches its lower position.

4,002,212

ROTARY IMPACT MECHANISM

Knut Christian Schoeps, Tyreso, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Sept. 22, 1975, Ser. No. 615,429
Claims priority, application Sweden, Oct. 2, 1974, 7412380
Int. Cl.² B25D 15/00
U.S. Cl. 173—93.5 7 Claims



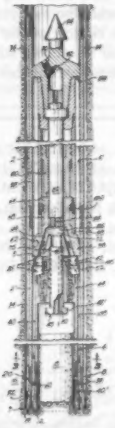
1. A rotary impact mechanism comprising a rotatable anvil (2), a hammer (4) coaxially rotatable relative to the anvil, an impact dog (7) which is shiftable between an impact position and a free-running position and which in its impact position interconnects the hammer (4) and the anvil (2), and a control spindle (11) arranged to initiate impacts by shifting the impact dog (7) from said free-running position to said impact position, the improvement comprising a lock dog (13) movable between an inactive position and a locking position in which latter position the control spindle (11) is caused to initiate an impact, a spring (18) biasing said lock dog (13) toward said locking position and a release cam (21) arranged for instantaneous displacement of said lock dog (13) to said inactive position during rotation of the hammer (4).

4,002,213

DOWN-THE-HOLE MOTOR FOR ROTARY DRILL ROD AND PROCESS FOR DRILLING USING THE SAME

Gerald T. Sweeney, Federal Way, Wash., assignor to Tigre Tierra, Inc., Puyallup, Wash.

Continuation of Ser. No. 447,360, March 1, 1974, Pat. No. 3,733,209, which is a continuation-in-part of Ser. No. 283,208, Aug. 23, 1972, Pat. No. 3,854,537. This application May 7, 1975, Ser. No. 575,346
Int. Cl.² E21B 49/00
U.S. Cl. 175—58 19 Claims



1. A process for removing a core sample from an earth formation comprising excavating a hole in the earth formation by driving a rotary drill rod into the same comprising an elongated pipe having a longitudinally extending bore therethrough and a pair of inner and outer bits at the distal end thereof, the outer of which bits is annular and the inner of which bits is inserted in the rod adjacent the opening of the annular bit and retractable from the rod through the bore of the pipe, retracting the inner bit from the bore, inserting a core barrel and then a down-the-hole motor in the bore, arranging the core barrel adjacent the opening in the outer bit, rotating the rod while operating the motor to drive the rod and barrel forward in unison with one another to collect a core sample in the barrel, and retracting the motor and the core barrel from the bore to remove the sample from the formation.

4,002,214

DRILLING TOOL, ESPECIALLY FOR HAMMER DRILLS

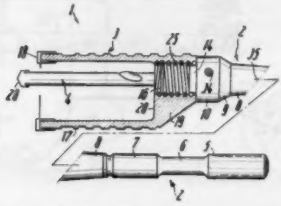
Dietrich Schaumann, Weingarten, Germany, assignor to Hawera Probst Kommanditgesellschaft Hartmetall-Werkzeugfabrik Ravensburgh, Ravensburg, Germany

Filed Apr. 23, 1975, Ser. No. 570,719

Claims priority, application Germany, Apr. 23, 1974, 2419548

Int. Cl.² E21B 9/12

U.S. Cl. 175—405 17 Claims



1. A boring tool, especially for drill hammers, which includes: a borer shank comprising in combination a holding mandrel provided with an outer thread and with an outer helical centering surface between the windings of said outer thread, a hollow drill core bit provided with an inner thread corresponding to said outer thread and together with the latter forming a helical passageway while having an inner helical centering surface located between the windings of said inner thread and in centering engagement with said outer helical centering surface, and a cylindrical wire coil-thread insert located in said helical passageway and firmly interconnecting said bit and said shank, said centering surfaces between said outer and said inner threads being cylindrical and being provided at least within the region of the ends of said wire coil thread insert, said helical centering surfaces extending in an uninterrupted manner between adjacent windings of said wire coil-thread insert.

4,002,215

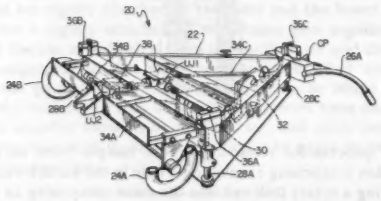
PORTABLE WEIGH APPARATUS FOR MEASURING LIQUID VOLUME

William Andrew Harvill, Decatur, Ga., assignor to The Coca-Cola Co., Atlanta, Ga.

Filed Feb. 26, 1976, Ser. No. 661,899

Int. Cl.² G01G 7/02

U.S. Cl. 177—146 12 Claims



1. In a system for measuring the volume of material dispensed into a container, a mobile weigh cart comprising:

frame means, said frame means having a top surface, a bottom surface and fore and aft ends;

wheel means rotatably secured to said fore end of said frame means;

handle means secured to the aft end of said frame means for lifting said frame means to facilitate the transportation of said frame means on said wheel means;

jack means extending from the bottom surface of said frame means for lifting said frame means and said container;

load cell means disposed on the top of said frame means for supporting said container, sensing the load generated thereby, and generating a signal proportional to said load;

display unit means for directly indicating the volume based upon the density of said material in said container in response to said signal generated by said load cell means;

support means on he top of said frame means for removably supporting said display unit means;

motive power means supported by said frame means for generating a lifting force to drive said jack means; and

control means for energizing said motive power means.

4,002,216

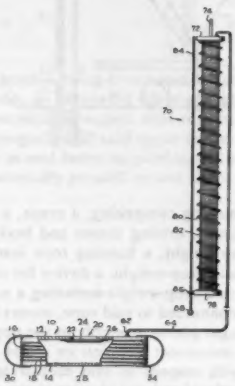
PORTABLE SCALE

Benjamin Solow, 5743 Rhodes Ave., North Hollywood, Calif. 91607

Filed Sept. 24, 1975, Ser. No. 616,495

Int. Cl.² G01G 5/04, 21/00

U.S. Cl. 177—208 13 Claims



1. A portable weight-measuring scale comprising:

a pneumatic platform having an upper board, a lower board and with a peripheral skirt therearound and attached to both said upper board and said lower board to defined a platform pneumatic volume of substantially constant area, said upper board being free to rock and move in a parallel plane with respect to said lower board so that, when a weight is placed on said upper board, pneumatic pressure in said pneumatic volume is proportional to the weight on said upper board; and

means separate from said platform and connected to said pneumatic volume for measuring the pressure in said pneumatic volume to indicate the weight on the platform.

4,002,217

AIR COOLED TRACTOR CARBURETOR

David A. Fulghum; David A. Powers, both of La Grange; Ross M. Lathrop, Downers Grove, and Robert W. Swallow, Oak Lawn, all of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Oct. 14, 1975, Ser. No. 621,978

Int. Cl.² B60K 11/06

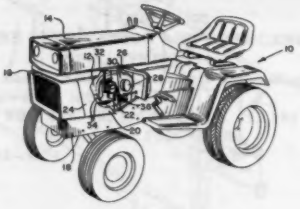
U.S. Cl. 180—54 A 2 Claims

1. A carburetor cooling arrangement for an air cooled engine including, in combination:

a carburetor mounted on said engine;

a cooling air shroud mounted on said engine, having said carburetor outside the enclosure defined by said shroud, and having a diverter aperture in close proximity to said carburetor;

cooling air means for controlled flow of cooling air through said shroud and over said engine, and for controlled flow of cooling air through said aperture to cause an air flow over said carburetor; and



an enclosure substantially surrounding said engine, said shroud, said carburetor, and said cooling air means.

4,002,218

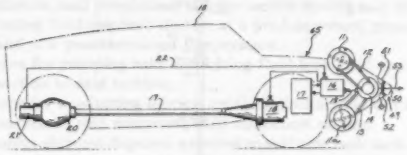
ELECTRICAL VEHICLE

George T. Horvat, 1319 S. 102nd St., West Allis, Wis. 53214

Continuation-in-part of Ser. No. 515,354, Oct. 16, 1974, abandoned. This application July 17, 1975, Ser. No. 596,578

Int. Cl.² B60K *1/00*

U.S. Cl. 180—65 DD 8 Claims



1. A vehicle, comprising means including an outer body portion for supporting motive means having an electrical input and a mechanical output operatively propelling said vehicle, energy storage means connected to said supporting means and operatively connected to said input and providing electrical power to said motive means and propelling said vehicle, and means providing an energy source connected to said supporting means and including electrical generating means providing an electrical output in response to the operation of a mechanical input mounted externally adjacent to said body portion, said mechanical input including a rotatable member having an axis substantially normal to the direction of vehicle movement and providing a plurality of circumferentially spaced and substantially flat radial vanes, said body portion providing an axially extending substantially impervious groove having a pair of axially spaced end walls with one end wall providing a port and partially surrounding said rotatable member and exposing at least one of said vanes having a radial end portion spaced from said body portion and responding to direct fluid current flow external to said body portion in response to vehicle movement and rotating said mechanical input with a substantial portion of the exhausted direct fluid current flow leaving the relatively flat radial vanes in an outward direction external to said outer body portion with fluid trapped in said groove passing through said port and said electrical output being supplied to said storage means.

4,002,219

AUTOMATIC SAFETY BELT SYSTEM, PARTICULARLY FOR VEHICULAR, ESPECIALLY AUTOMOTIVE USE

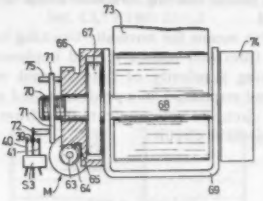
Helmut Steinmann, Baden-Baden, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Feb. 24, 1976, Ser. No. 660,857

Claims priority, application Germany, Mar. 15, 1975, 2511442

Int. Cl.² B60R *21/00*

U.S. Cl. 180—82 C 17 Claims



1. Automatic safety belt system, particularly for vehicular use, comprising

a belt supply roller unit (69) having a shaft (68) to hold a belt (73) rolled on said unit and permit extension therefrom, the shaft rotating upon wind-up, and paying out of the belt (73);

a spring (67) coupled to the shaft to hold the belt under resilient spring tension;

and an electric motor (M) operatively coupled to the roller unit to effect wind-up of the belt thereon,

wherein the improvement comprises

a drive train (63, 64, 65, 66) mechanically serially connecting the motor (M), the spring (67) and the shaft (68) of the roller unit to permit resilient extension, or retraction of the belt against tension of the spring with approximately uniform belt tension characteristics regardless of the length of extension of the belt from the roller unit.

4,002,220

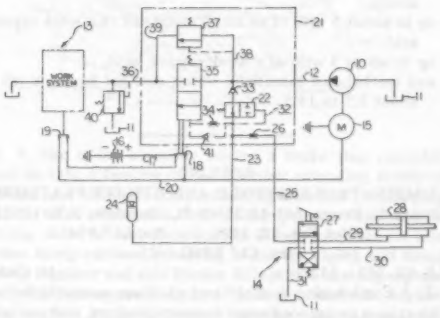
PRIORITY STEER SYSTEM—HYDRAULIC

John E. Wible, Painesville, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed July 11, 1975, Ser. No. 595,202

Int. Cl.² B62D *5/08*

U.S. Cl. 180—141 6 Claims



1. A hydraulic steering system for an electric-powered vehicle comprising in combination:

a hydraulic pump;

means for driving said pump including an electric motor and a source of electric power including a circuit for said electric motor;

steering motor means;

implement motor means;

steering circuit means including accumulator means for selectively directing hydraulic fluid for powering said steering motor means;

implement circuit means including control means for selectively directing hydraulic fluid for powering said implement motor means;

priority means including first valve means for normally communicating fluid from said source to said accumulator means and responsive to a predetermined maximum pressure in said steering circuit to block said communication; and,

second valve means for normally blocking communication of fluid from said source to said implement system for establishing a priority of fluid to said steering circuit means and responsive to a predetermined pressure in said steering circuit to communicate fluid from said source to said implement circuit.

4,002,221

METHOD OF TRANSMITTING ULTRASONIC IMPULSES TO SURFACE USING TRANSDUCER COUPLING AGENT

Gilbert Buchalter, 555 Mount Prospect Ave., Newark, N.J. 07104

Continuation-in-part of Ser. No. 304,713, Nov. 18, 1972, abandoned, which is a continuation-in-part of Ser. No. 76,610, Sept. 29, 1970, abandoned, which is a division of Ser. No. 290,402, Sept. 19, 1972. This application Nov. 15, 1974, Ser. No. 524,316

Int. Cl.² G10K *11/00*

U.S. Cl. 181—.5 **3 Claims**

1. In a method of transmitting ultrasonic impulses to a surface in contact with transducer means with a conductivity gap therebetween, the improvement comprising applying a transducer coupling agent to said conductivity gap formed of a composition consisting essentially of:

about 1/20th of 1 wt% to 10 wt% of a long chain water soluble ionic polymeric thickener having a Brookfield Viscosity (CPS) of approximately 1000 to 100,000 at 1 wt% concentration in H_2O and neutralized with an alkaline agent, said thickener being selected from the group consisting of a copolymer of methyl vinyl ether and maleic anhydride, carboxy polymethylene polymer and mixtures thereof,

about 1/1000 of 1 wt% to 3 wt% of a hydroxy alkyl cellulose polymer as an auxiliary thickener,

about 10% to 25% by weight of a polyalkylene glycol humectant, said alkylene group containing 2 to 10 carbon atoms,

up to about 5 wt% of an alkali metal salt of a weak organic acid,

up to about 5 wt% of a weak organic acid,

and the balance essentially water, said gel having a pH of about 3.5 to 11.5.

4,002,222

COMBINATION SCAFFOLD AND UTILITY PLATFORM

Edward G. Bruno, 141-18 250th St., Rosedale, N.Y. 11422

Filed Feb. 27, 1976, Ser. No. 661,974

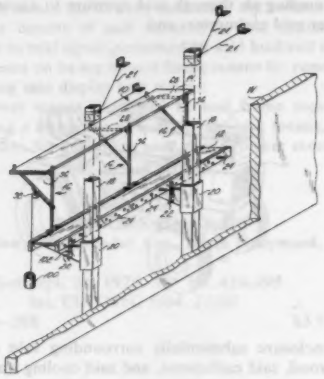
Int. Cl.² E04G *1/15*

U.S. Cl. 182—132 **10 Claims**

1. A combination scaffold and platform assembly for use with at least two spaced apart support members, said assembly comprising:

a. first elongated platform means adapted to be removably positioned on the support members in spanning relationship therewith, said first platform means including a first plurality of transverse openings therein, said first plurality of openings being spaced apart along the length dimension of said first platform means in a first common plane;

b. a plurality of coupling means having a portion thereof for removably engaging said openings in said first platform means; and



c. second elongated platform means positioned on said coupling means in a plane that is above and alongside said first platform means.

4,002,223

TELESCOPING COLLAPSIBLE LADDER

Keith David Bernkrant, Miami, Fla., assignor to Firearms Import and Export Corporation, Miami, Fla.

Filed Apr. 14, 1976, Ser. No. 677,044

Int. Cl.² E06C *1/36*

U.S. Cl. 182—156 **7 Claims**

1. In a ladder comprising parallel side members and a plurality of parallel steps traversing said side members and affixed thereto, said ladder having a major plane, the improvements wherein:

said side members each include a tubular female section and a male section in concentric, telescoping relation with said female section and collapsible and extendable with respect thereto;

said male and female sections each comprising plastic pipe with said male sections fitting slidably inside said female sections;

said side members each further including additional male and female telescoping sections of plastic pipe alternating along the length of said ladder;

said side members further including joints between said male and female sections; and

sleeves at said joints arranged in pairs embracing said steps;

said male sections having enlarged ends; and

one of said sleeves in each pair forming a stop for one of said enlarged ends;

whereby said side members of said ladder may be telescopically adjusted between collapsed and extended positions for adjusting the length of said ladder.

4,002,224

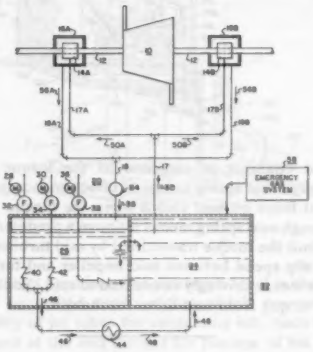
TURBINE LUBRICATION AND EMERGENCY GAS SYSTEM

Michael J. Easter, Aston, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 26, 1975, Ser. No. 553,181

Int. Cl.² F02C 7/06

U.S. Cl. 184—6.11 **3 Claims**



1. A lubrication system for providing lubricating fluid to a turbine apparatus comprising:

a lubricating fluid reservoir tank having a pressurized storage section and a nonpressurized collection section therein, said pressurized storage section having said lubricating fluid disposed therein at a predetermined pressure and at a predetermined temperature,

means for pumping said lubricating fluid from said storage section to said turbine,

means for conducting lubricating fluid discharged from said turbine to said nonpressurized collection section,

a cooler element disposed external to said reservoir tank for lowering the temperature of said lubricating fluid to said predetermined temperature, said lubricating fluid passing from said collection chamber through said cooler element and into said pressurized storage section as said lubricating fluid is pumped to said turbine from said storage section, and,

an emergency gas system for maintaining a flow of pressurized lubricating fluid to said turbine in the event of cessation of operation of said pumping means, said emergency gas system including

a gas storage section integral with said reservoir tank, said gas storage section having a predetermined quantity of gas having a predetermined pressure disposed therewithin,

a conduit connecting said gas storage section with said pressurized storage section,

said predetermined pressure of said lubricating fluid being greater than said pressure within said stored gas when said pump means is operable, said lubricating fluid at said predetermined pressure maintaining said gas entirely within said gas storage section when said pump means is operable,

said pressure within said lubricating fluid decreasing below said pressure within said gas when said pump means ceases operation, said gas expanding from said storage section and communicating with said pressurized section through said conduit,

said gas expanding into said pressurized section through said conduit exerting a force on said lubricating fluid therewithin to move said fluid to said turbine.

4,002,225

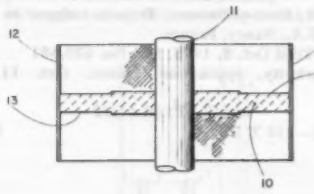
RESURFACED BRAKE DISCS

Glenn R. Marin, Ransomville, N.Y., assignor to The Carborundum Company, Niagara Falls, N.Y.

Division of Ser. No. 374,742, June 28, 1973, Pat. No. 3,871,934. This application Feb. 18, 1975, Ser. No. 550,328

Int. Cl.² F16D 65/12

U.S. Cl. 188—73.2 **5 Claims**



1. A carbonaceous brake disc, the disc having at least one periphery and including at least one flat surface, the brake disc comprising a flexible, permeable tape which circumvents the periphery of the disc at least once and overlaps and covers at least a portion of the flat surface of the disc to form a flat friction wearing surface thereon; the flexible, permeable tape being bonded to the flat surface by baked impregnated resin.

4,002,226

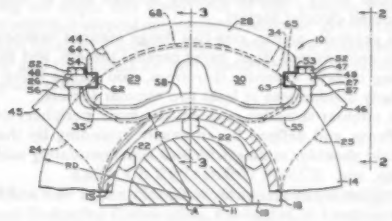
DISC BRAKE

Jack D. Rainbolt, Troy, and Ronald R. Suerdieck, Tipp City, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Dec. 15, 1975, Ser. No. 640,590

Int. Cl.² F16D 55/224

U.S. Cl. 188—73.3 **10 Claims**



1. A disc brake assembly having a brake disc rotatable about an axis, a floating caliper member extending axially of said disc and having radially extending members overlapping opposite faces of said disc, friction lining carriers disposed on opposite sides of said disc, friction linings mounted on said friction lining carriers, actuating means for urging said lining carriers together and said friction linings into braking engagement with said opposite faces of said disc, and said friction lining carriers being interposed between said disc and said radially extending members of said caliper member wherein said brake assembly comprises a non-rotatable mounting member having arms extending radially outward to circumferentially spaced-apart positions relative to said disc providing a space between said arms for said caliper member, a supporting slider member having axially extending rails mounted on said arms, said caliper member being supported by said rails and in sliding engagement in the axial direction, said friction lining

carriers being supported by and in torque transmitting sliding engagement with said rails in the axial direction, and a tie bar member connecting said axially extending rails, said tie bar member having a circumferentially extending center portion and radially extending end portions connected to said rails at the radially outer ends, said center portion of said tie bar member being located radially inward of one of said radially extending members of said caliper member overlapping one of said faces of said disc to minimize the axial length of said brake assembly and damp the forces exerted on said rails by said lining carriers.

4,002,227

BRAKE DISC ASSEMBLY

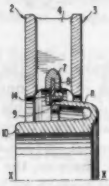
Pierre Simon, Pont-a-Mousson, France, assignor to Pont-A-Mousson S.A., Nancy, France

Filed Oct. 8, 1975, Ser. No. 620,681

Claims priority, application France, Oct. 11, 1974, 74.34224

Int. Cl.² F16D 65/12

U.S. Cl. 188—218 X L 5 Claims



1. A brake disc and hub assembly, comprising:
a. a cylindrical hub adapted to be secured to a wheel, axle or the like to be braked,
b. a flexible cylindrical web integral with the hub and extending back over a portion of the hub from one end thereof in a concentric manner,
c. a circular lip provided on an inner end of said web and being defined by an out-turned peripheral edge thereof,
d. two axially spaced, planar, parallel friction rings interconnected by a plurality of radial ribs, said interconnected rings being circumferentially divided into at least two joined circular sectors,
e. a generally planar, ring-like flange secured between said interconnected rings, being parallel thereto, and extending radially inwardly therefrom, said flange being similarly divided into at least two circular sectors,
f. a circular shoulder adjacent the inner periphery of said flange and defined by an axially extending lip thereon, said shoulder mating with and accommodating said web lip, and
g. a plurality of screws securing said mated web and flange together.

4,002,228

HYDRODYNAMIC DRIVE AND SLIPPING CLUTCH

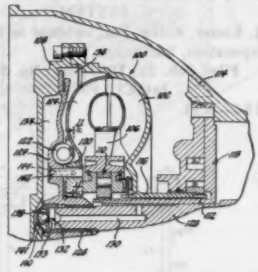
August H. Borman, Farmington, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed June 23, 1975, Ser. No. 589,595

Int. Cl.² F16D 39/00

U.S. Cl. 192—3.3 1 Claim

1. A drive mechanism comprising:
a torque converter including an input shell adapter to be driven by a prime mover, an impeller secured to said input shell and cooperating therewith to form an enclosed fluid space, a turbine disposed in the fluid space between said input shell and said impeller and cooperating with said impeller to form a toroidal fluid circuit, and an output hub connected to said turbine;
a fluid operated friction clutch disposed between said turbine and said input shell, an engagement chamber formed between said clutch and said turbine, a disengagement chamber formed between said clutch and said input shell, and a plurality of compression spring means for providing a drive torque transmitting connection between said turbine and said output hub;
variable opening passage means formed on said turbine and output hub for controlling fluid flow to said disengagement chamber in response to the torque transmitted through said spring means to effect an increasing engagement force on said clutch when the torque transmission through said spring means is above a predetermined value to limit the torque transmitted by said turbine and to limit the slip speed between said impeller and turbine, and
output means drivingly connected to said clutch for delivering torque from said drive mechanism.



4,002,229

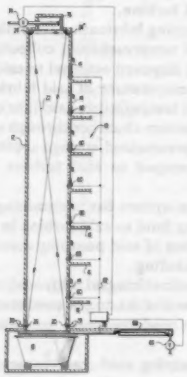
TRASH CHUTE LOCKING SYSTEM

Norris J. Washington, 5419 16th Ave., Terrace 2, Hyattsville, Md. 20782

Filed May 19, 1975, Ser. No. 578,857

Int. Cl.² E04F 17/10

U.S. Cl. 193—34 9 Claims



1. A trash chute system for preventing trash from being deposited in a trash chute which has a blockage in a multistory structure including:
a trash chute having multiple entrances,
beam-emitting means for transmitting a beam longitudinally of said chute past a plurality of said entrances,
receiver means positioned in the path of said beam to receive said beam,
means connected to the receiver means for generating a

malfunction signal when the beam is interrupted between the entrances and between the beam-emitting means and the receiver means, and

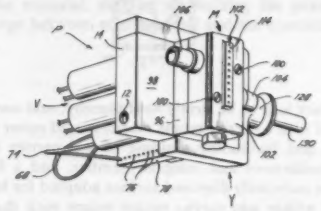
access-preventing means at each trash chute entrance operable in response to said malfunction signal to prevent entry to said chute and to prevent trash from being deposited when there is a blockage in the trash chute.

4,002,230

PRINT HEAD APPARATUS

Joseph L. Schweppe; Jerry L. Mille, and Kenneth R. Rhodes, all of Houston, Tex., assignors to Houston Engineering Research Corporation

Filed July 9, 1975, Ser. No. 594,370
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R **9 Claims**



1. A print head apparatus for printing a label in the form of a selectively controlled matrix of dots of ink, comprising:

a. a plurality of jet tubes for containing ink, each having a jet formed at the end thereof for passage of ink droplets for application as dots of ink on the label;

b. a plurality of coupling conduits, each for conveying ink to one of said plurality of jet tubes;

c. an ink manifold plate having an inlet opening for receiving ink and a plurality of ink passages formed therein for distribution of ink therein to plural connecting openings;

d. said ink manifold plate further having said jet tubes mounted transversely therethrough with said jets of said jet tubes facing the surface of the label, and further with said jets of said jet tubes arranged in a pattern to form a matrix during relative movement with respect to the surface of the label;

e. a plurality of valves, each of said valves having an inlet mounted in one of said connecting openings in said ink manifold plate and an outlet in communication with one of said coupling conduits; and

f. each of said valves further including means opening in response to control signals to permit ink to pass therethrough to one of said coupling couduits and one of said jet tubes to said jet thereof to displace a droplet of ink from said jet and apply a dot of ink to the label.

4,002,231

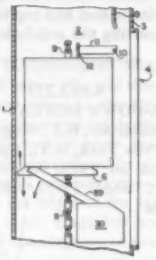
LOAD TRANSFER MECHANISM AND JAM PREVENTING CONTROLS FOR A VERTICAL SHELF CONVEYOR

Verle L. Doty, Harrison, Ohio, assignor to Kornylak Corporation, Hamilton, Ohio

Filed Oct. 17, 1974, Ser. No. 515,676
Int. Cl.² B65G *43/00*
U.S. Cl. 198—483 **30 Claims**

1. In a material handling conveyor, having a plurality of generally horizontal article carrying shelves selectively driven by an electric motor upwardly or downwardly within a casing between vertically spaced load transferring stations at least one of which has an opening extending generally in a vertical plane in one side of the casing providing access for loading and unloading of articles with respect to the conveyor shelves; the improvement being in safety control means for sensing an article that has been improperly transferred and for further stopping the conveyor before the misplaced article can cause material damage, which control mechanism comprises:

a cable; means mounting at least a portion of said cable to extend horizontally, parallel with said opening vertical plane, between opposite sides of said casing, adjacent and inwardly of the upper portion of said opening, and positioned so as to be outwardly of the vertical path of movement of said shelves, out of the normal path of movement of an article being carried by said shelves and in the path of movement of an article improperly transferred to said shelves; electrical switch means responsive to deflection of said cable portion when struck by an improperly transferred article for deactivating said electrical motor and thus stopping the driving of said shelves to prevent jamming of an article between an upwardly moving shelf and the conveyor casing; said mounting means fixedly secur-



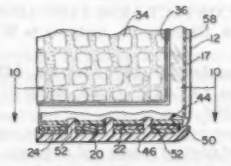
ing one terminal end of said cable portion to said casing at one of said opposite sides; said mounting means at the other end of said horizontal cable portion, changing the cable direction from vertical to horizontal for the remainder of said cable at the other of said opposite sides; means biasing the vertically extending opposite terminal end of said cable for pulling the horizontal portion of said cable; said switch means being responsive to vertical movement of said opposite terminal end of said cable; and said mounting means including a vertically elongated rod secured at its upper end to said opposite terminal end of said cable, guide means secured to said casing and guiding the upper and lower ends of said elongated rod for controlled vertical movement in response to deflection of said horizontal portion of said cable, and a weight secured to said rod means for movement therewith between said guide means.

4,002,232

ARTICLE RETAINING POUCH

Richard C. J. Palson, Medfield, Mass., assignor to International Packaging Corporation, Pawtucket, R.I.

Filed Apr. 7, 1975, Ser. No. 565,760
Int. Cl.² A45C *11/04;* **F16B** *19/04*
U.S. Cl. 206—5 **5 Claims**



1. A pouch for retaining an article therein, comprising a first sheet of plastic material, a second sheet of plastic material secured to said first sheet along a seal line to form an interior

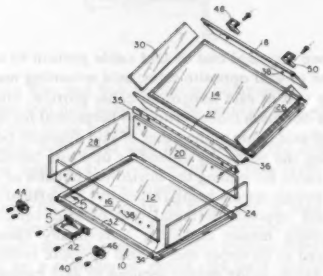
pocket between said sheets, a light-weight, flexible sheet of metal material captured in said pocket and conforming generally to the configuration of said sheets, said plastic sheets and metal sheet captured therebetween being bent along a longitudinal axis approximately at the midpoint thereof, wherein the opposed longitudinal edges of said first sheet are secured together to define a longitudinal side edge of said pouch, and a rigid end cap joined to said first sheet at an end thereof to define a closed end of said pouch, an end of said first plastic sheet extending beyond said second plastic sheet and metal sheet as disposed in said pocket and defining end portions, said end cap including a pair of cap portions, one of said cap portions having a plurality of projections formed thereon, the other cap portion having a plurality of openings formed therein that receive said projections in a locking position of said cap portions, said end portions being received between said cap portions for the securement thereof in the locking position to seal the closed end of said pouch, the end of said plastic sheets opposite to said end cap being exposed to define an open end for receiving the article in the pouch.

4,002,233

KNOCK-DOWN DISPLAY CASE KIT

Vernon Page, Jr., Montclair, N.J., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Feb. 20, 1976, Ser. No. 659,667
Int. Cl.² B65O *25/54*; A45C *13/00*
U.S. Cl. 206—45.34 **7 Claims**



1. A knock-down portfolio case kit comprising:
a pair of identical rectangular side panels;
a pair of identical rectangular top panels;
a pair of identical rectangular bottom panels;
a pair of identical rectangular front and back panels;
means on said top, bottom, front and back panels for slidably connecting one of said panels to each of said side panels;
removable hinge means pivotally connecting said bottom panels to each other; and
alternate top, bottom, front and back panels of a different depth interchangeable with said top, bottom, front and back panels.

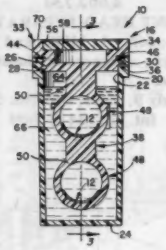
4,002,234

CONTACT LENS CONTAINER

Samuel Loshaek, Chicago, Ill., assignor to Wesley-Jessen Inc., Chicago, Ill.

Filed Jan. 29, 1975, Ser. No. 545,024
Int. Cl.² A45C *11/04*; B65D *81/24*
U.S. Cl. 206—205 **8 Claims**

1. A container particularly adapted for use in carrying and storing a pair of contact lenses and a storage solution therefor comprising a body means which includes a generally hollow casing member having an open end portion defining a single access opening therethrough, a closed end portion opposite said open end, and first securing means located adjacent said opening; and a carrier means which includes a single integrally formed member, which comprises in integral combination, a closure portion for completely closing said open end whenever in an assembled condition, a second securing means operatively cooperating with said first securing means whenever in the assembled condition for detachably securing said carrier means to said body means, and lens holding means including at least two adjacent lens receptacle means arranged in a tandem relationship, each one of which enables a respective contact lens to be firmly held thereby, said carrier means is formed with a carrier recess means in said cover portion for enabling and facilitating molding of said carrier means in a single, continuous and integral member, and a lid member having an outwardly disposed surface adapted for being snugly received within said carrier recess means such that said outwardly disposed surface faces exteriorly whenever said lid member is received with said carrier recess means.

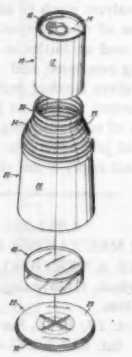


4,002,235

HEAT TRANSFER PACKAGE WITH A COLLAPSIBLE, PLEATED, FRUSTO-CONICAL, UPPER WALL SECTION

William R. Donnelly, Piqua, Ohio, assignor to Readi Temp, Inc., Piqua, Ohio

Continuation of Ser. No. 355,925, April 30, 1973, abandoned. This application Feb. 27, 1975, Ser. No. 553,822
Int. Cl.² C25D *17/02*
U.S. Cl. 206—219 **11 Claims**



1. A heat transfer package comprising a container including a base and a peripheral outer wall structure which is self-stabilizing and adapted thereby to normally maintain the configuration of said container, said wall structure being configured to receive, interiorly of one end thereof, a receptacle the contents of which are to be subjected to heat transfer, said wall structure having in connection therewith means to engage

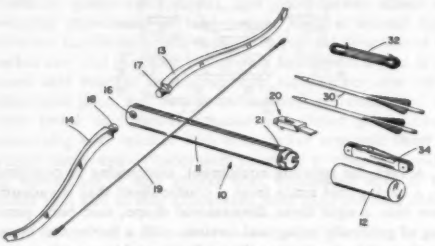
and form a seal about a portion of said receptacle and to mount said receptacle so as to nest interiorly within one end of said container and in substantially spaced relation to the opposite end thereof, means forming a closure of said opposite end of said wall structure forming said base, said closure being arranged to define, with said receptacle, a sealed chamber, a peripheral wall portion of which is provided by said outer wall structure, said chamber accommodating therein heat transfer material in an inactive state, whereby said material, when activated, induces heat exchange with its environment, and said outer wall structure being an integrated wall structure, portions of which are arranged to nest, one within the other, in response to a predetermined axial force applied to the upper portion of said receptacle while said container is resting on said base, thereby to provide means for locking said wall portions in their nested relationship, thereby to produce a reduction in the axial length of said outer wall structure and to lock said receptacle in an inwardly nested proximity to said heat transfer material, thereby maximizing the potential for heat exchange between said material and the contents of said receptacle.

4,002,236

SURVIVAL KIT COMPRISING COLLAPSIBLE CROSS-BOW

Gary L. Tolleson, 25418 Outlook Drive, Carmel, Calif. 93921

Filed Sept. 22, 1975, Ser. No. 615,288
Int. Cl.² F41C *19/00;* **A45B** *9/06;* **A63D** *55/00*
U.S. Cl. 206—577 **10 Claims**



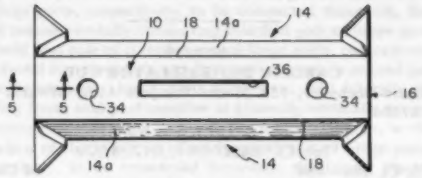
1. A survival kit comprising an elongated hollow tubular body of circular cross-section closed at one end by a solid plug, a cap removably sealing the other end of said hollow tubular body water-tight to provide a sealed container of given length, a pair of resilient arms of equal length less than said given length of said sealed container, means removably mounting one end of each of said pair of arms in said solid plug at said one end of said elongated hollow tubular body with said arms extending normally to the axis of said hollow tubular body in a common plane on opposite sides thereof, a bowstring having its opposite ends each removably mounted under tension at the free end of a different one of said pair of resilient arms, and a trigger mechanism releasably holding said bowstring under tension with said resilient arms flexed removably mounted on the exterior of said hollow tubular body at a point spaced along said elongated tubular body from said plug closing said one end thereof in a plane normal to said plane in which said pair of arms extend, whereby said arms, said bowstring and said trigger mechanism may be removed and received within said sealed container provided by said elongated hollow body and said cap.

4,002,237

PENCIL CADDY

Gordon E. Nichols, Middleboro, Mass., assignor to Winthrop-Atkins Co., Inc., Middleboro, Mass.

Filed May 5, 1975, Ser. No. 574,746
Int. Cl.² B65D *85/28;* **A45C** *11/34*
U.S. Cl. 206—371 **6 Claims**



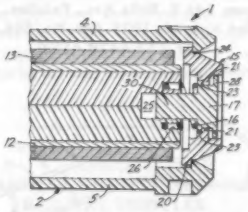
1. A pencil caddy, comprising an elongated hollow body having top, bottom and side walls, said side walls being hinged at their upper and lower edges to the top and bottom walls, and hinged intermediate their top and bottom edges parallel to the hinges at the top and bottom edges, said body having open ends the edges of which are defined by the end edges of the top, bottom and side walls and said edges of the side walls at each end sloping from the edges of the top and bottom walls inwardly and meeting at the hinge line intermediate the side walls, such that the end openings are re-entrant and end members hinged at the opposite ends to the end edges of the top and bottom walls and corresponding in length to the lengths of the end edges of the side wall, said end members being adapted to be sprung into the re-entrant openings to hold the body distended and to be withdrawn from the openings to permit the body to be flattened.

4,002,238

MAGNETIC TAPE CARTRIDGE WITH REMOVABLE SPOOL

Douglas H. Cameron, Stillwater, and Bryan M. Clem, Minneapolis, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 542,025, Jan. 17, 1975, abandoned. This application Nov. 21, 1975, Ser. No. 634,287
Int. Cl.² B65D *85/67;* **B65H** *19/00*
U.S. Cl. 206—408 **7 Claims**



1. In a tape cartridge including a rotatable tape spool enclosed in a housing having a bottom wall, a pair of sidewalls, a pair of end walls each with an aperture opening into said housing and aligned with the ends of said spool, and an open top closed by a cover hinged to one of said sidewalls, wherein said tape spool has a cavity formed in each end and is removably held in the housing by support devices at each end of the housing, said support devices including a collar and a dowel adapted to rotate with said spool and means spring biasing said dowel in a direction away from said spool, whereby:

each collar has an interior flange formed with at least one

notch and an exterior flange that is normally seated in said housing end wall aperture; and

each dowel has a head greater in diameter than the opening defined by the interior flange of the collar, a body that extends from one side of said head and terminates in a drive lug that conforms with the cavities in the ends of the spool, and an intermediate shoulder to impede insertion and removal of the body through said opening unless said shoulder is aligned with said notch.

4,002,239

CARDIAC DEFIBRILLATOR CUP

Gilbert Buchalter, 555 Mount Prospect Ave., Newark, N.J. 07104

Filed Nov. 15, 1973, Ser. No. 416,230
Int. Cl.² B65D *5/64, 5/42, 81/24*
U.S. Cl. 206—484 **14 Claims**

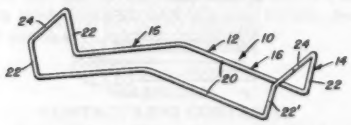
1. A cup for holding a semi-solid or liquid electrolyte, comprising a container having flexible walls and one open face, the peripheral edges defining said open face having a layer of bonding agent disposed thereon, said container including a protective cover positioned thereon so as to close off said open face and being removably secured to said layer of bonding agent, said protective cover including a sheet material removable from said container without removing said layer of bonding agent therefrom, said bonding agent being also operative after said protective covering is removed to removably secure said container and the electrolyte to a surface of an electrode paddle, the flexible walls of said container being compressible to expel the electrolyte therefrom onto said electrode paddle and said container functioning as a spatula to spread the electrolyte over said electrode paddle after it is expelled thereon.

4,002,240

COMBINED BOOKRACK AND BOOK SUPPORT

Edward G. Dorn, 145 S. Belle Ave., Palatine, Ill. 60067

Filed Apr. 10, 1975, Ser. No. 566,697
Int. Cl.² A47B *65/00*
U.S. Cl. 211—42 **3 Claims**



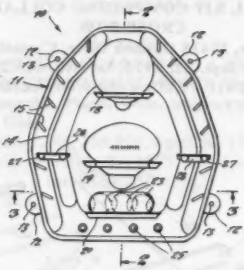
1. An invertible book retaining stand comprising a unitary book receiving base member, said base member having opposed ends, a planar end member rigidly fixed to each of the opposed ends of the base member and angularly directed relative thereto to one side thereof and terminating in an outer end edge, the end members being of equal height, said base member comprising a first portion which, when upwardly directed, defines two rigidly joined angularly related planar sections oppositely inclined downwardly and outwardly from an intermediate location along the length of the base member to the opposted ends thereof, said end members, when the first portion of the base member is upwardly directed, projecting upwardly to a vertical height above that of the intermediate location and defining a bookend-type abutment against which a section supported upright book will engage and be maintained, said base member having a second portion which, when upwardly directed upon an inverting of the stand, is defined by two angularly related planar sections oppositely inclined upwardly and outwardly from an intermediate location along the length of the base member to the opposed ends thereof for reception of an open book thereon, said end members, when the second portion of the base member is upwardly directed, projecting downwardly and defining base member elevating legs, the planar sections of the first portion and the second portion being of approximately equal length, the outer end edge of each end member being inclined, said retaining stand, when inverted with the second portion upwardly directed, having said second portion transversely inclined between the opposed edges thereof.

4,002,241

RACK FOR SPORTING EQUIPMENT

Edward Parrilla, Sr., 9480 Ridge Blvd., Lobey B, Brooklyn, N.Y. 11209

Filed Mar. 1, 1976, Ser. No. 662,330
Int. Cl.² A47F *7/00*
U.S. Cl. 211—88 **1 Claim**

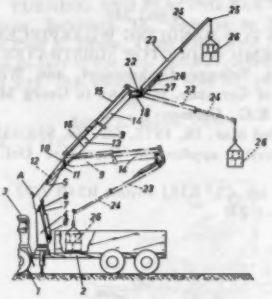


1. A rack for sporting equipment, comprising in combination, a back panel made from a plastic sheet that is vacuum-drawn into a rigid three dimensional shape, said back panel being of generally octagonal contour with a horizontal upper edge thereof being shorter than a horizontal lower edge, a set of formed ribs along each opposite side edges, an uppermost of said ribs extending vertically, a lowermost group of said ribs being slightly inclined from a horizontal plane while an intermediate group of said ribs therebetween are more greatly inclined respective to a horizontal plane, a set of sidewardly extending tabs along said opposite side edges each having an opening for receiving a mounting means to support said back panel on a vertical wall, a plurality of forwardly extending ledges formed on said panel, a set of trays formed of plastic having a rear ends thereof supported on said ledges while a rear terminal ends of said trays are fitted and heat-sealed inside shallow recesses formed on said panel thus supporting said trays on a front side of said panel, an uppermost of said trays for supporting a basketball, a lower tray for supporting several baseballs, an intermediate tray therebetween for supporting a football, a pair of forwardly extending, yoke-shaped, formed plastic fittings heat-sealed in shallow recesses formed in each sideward area of said panel for supporting a baseball bat, golf clubs or the like, and a horizontal row of recesses near a lower edge of said panel each having a rear end of a forward extending peg inserted thereinto for supporting a football helmet, cap or sports uniforms.

4,002,242
VEHICLE CRANES

Mats Erik Eriksson, Hudiksvall, Sweden, assignor to Hiab-Foco Aktiebolag, Hudiksvall, Sweden

Filed May 21, 1975, Ser. No. 579,718
Int. Cl.² B66C 23/00
U.S. Cl. 212—8 R 3 Claims



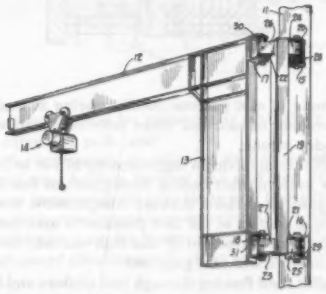
1. An improvement in vehicle-mounted cranes of the kind comprising a crane post, a hoisting arm arranged for swinging movement in a vertical direction relative to said crane post a first hydraulic piston-and-cylinder unit for effecting said swinging movement of said hoisting arm, said hoisting arm comprising an inner arm section articulated to said crane post and an outer arm section articulated to said inner arm section, a second piston-and-cylinder unit provided to effect swinging movement of said outer arm section, said outer arm section equipped with a boom displaceable substantially in the longitudinal direction of said arm section, the improvement comprising a bracket which is attachable to the outer end of said boom, a rocker arm hingedly connected to said bracket and arranged for swinging movement in a vertical plane, a third hydraulic piston-and-cylinder unit provided to effect said swinging movement of said rocker arm, a second boom mounted for displacement in the longitudinal direction of said rocker arm and provided with means to support a load in said boom said bracket connected with said rocker arm via an articulated joint, and two links hingedly interconnected at a point below said first-mentioned articulated joint likewise connecting said bracket with said rocker arm said third hydraulic piston-and-cylinder unit, provided to effect said swinging movement of said rocker arm, connected both to said rocker arm and to said articulated joint between said links.

4,002,243
JIB CRANE

Edward R. Kramer, Macedonia, Ohio, assignor to Stanspec Co., Cleveland, Ohio

Continuation of Ser. No. 531,605, Dec. 11, 1974, abandoned. This application Jan. 15, 1976, Ser. No. 649,221
Int. Cl.² B66C 23/06
U.S. Cl. 212—56 5 Claims

1. In a jib crane apparatus mountable on an upright supporting member for swinging of the jib crane in a horizontal plane and relative to the supporting member, said jib crane being adapted to carry and swing a load in arcs about two parallel spaced axes in alternative opposite directions on each of said axes whereby twisting actions are imparted by the jib crane dependent on the position of the jib crane upon being swung in one of said alternative directions on said axes, said jib crane including a generally horizontal boom portion and a generally vertical column portion fixedly secured to said horizontal boom portion at its end closest to said supporting member and extending from said boom portion generally parallel to said upright supporting member, the combination of a first pair of hinge parts adapted to be secured to said supporting member at vertically spaced locations thereon, a second pair of hinge parts secured to said vertical column portion of the jib crane at generally vertically spaced locations corresponding generally to the locations of said first pair of hinge parts, respectively, a post member spaced laterally of, and parallel to, said vertical column portion of the jib crane, a first pair of complementary hinge parts secured to and extending from said post member at generally vertically spaced locations corresponding generally to the elevation of the location of said first pair of hinge parts, respectively, to be connected therewith, first pivot means pivotally connecting said first pair of hinge parts and said first pair of complementary hinge parts, respectively, for pivotal movement about a first common axis, a second pair of complementary hinge parts secured to, and laterally extending from, said post member at generally vertically spaced locations corresponding generally in vertical location to the elevation of the locations of said second pair of hinge parts, respectively, to be connected therewith, the lateral dimensions of said post member being substantially greater than the



lateral dimensions of the hinge parts of the locations of said pivot means, and second pivot means pivotally connecting said second pair of hinge parts and said second pair of complementary hinge parts, respectively, for pivotal movement about a second common axis, said first and second means each including bearing means, said first and second common axes being spaced apart and disposed parallel to each other, said post member being vertically disposed and spaced substantially equidistantly from said common axes to be subjected to substantially equal degrees of twisting action imparted by the jib crane being swung in either of said arcs about said spaced common axes to positions in any of said alternate directions, the lateral distance between said common axes being substantially less than the maximum vertical extent of the post member between the uppermost and lowermost hinge parts, said post member extending substantially through the vertical extent of said hinge parts providing the said first and second pivot means to assist the said hinge parts to resist said twisting action.

4,002,244
BUFFER, PARTICULARLY SUITABLE FOR USE IN RAILWAY VEHICLES

Kiyoshi Matsumoto, Yokohama, and Toshiyuki Maeda, Tokyo, both of Japan, assignors to Japan Steel Works Ltd., Tokyo, Japan

Continuation of Ser. No. 542,113, Jan. 20, 1975, abandoned. This application May 7, 1976, Ser. No. 684,444
Claims priority, application Japan, Oct. 24, 1974, 49-121959
Int. Cl.² B61G 9/16
U.S. Cl. 213—43 6 Claims

1. A buffer, particularly for use in railway vehicles, comprising

a cylinder means;

a piston means having a piston rod and connected piston

slidably mounted for reciprocable movement within said cylinder means;

the periphery of said piston spaced from said cylinder means to form a gap therebetween;

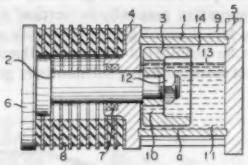
orifices formed to extend through said piston;

said piston means movable from an at rest position to a first position upon being subjected to low load impact;

said piston means movable further from said first position to a second position upon being subjected to a higher load impact;

a buffer fluid partially filling said cylinder means;

a gaseous medium filling the remainder of said cylinder means;



the volume of said gaseous medium being at least equal to the volume of said rod when fully extended within said cylinder means;

said buffer fluid having a high viscosity of 10^3 to 10^5 poise to allow uniform distribution throughout of fine bubbles of said gaseous medium that are compressible to absorb the low load impact at the first position of said piston means and prevent movement of said high viscosity fluid through said orifices and said gap; and

said buffer fluid flowing through said orifices and said gap to absorb the higher load impact when said piston means moves to said second position; and

means to return said piston means from said second position to said at rest position.

4,002,245

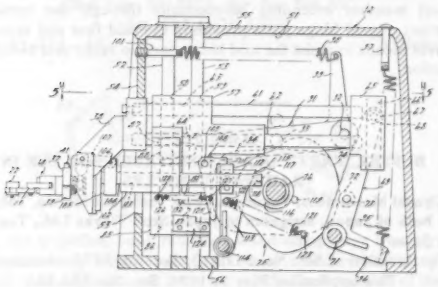
MATERIAL HANDLING APPARATUS HAVING GRIPPING MEANS FOR MOVING ARTICLES IN SEVERAL DIRECTIONS

George Mink, 13130 Geoffrey, Warren, Mich. 48093

Continuation-in-part of Ser. No. 506,113, Sept. 16, 1974. This application June 2, 1975, Ser. No. 583,099

Int. Cl.² B65G *47/08*

U.S. Cl. 214—1 BD 23 Claims



1. A material handling apparatus comprising gripping means for releasably restraining a workpiece, support means for said gripping means, first motion transfer means for moving said supporting means in a first direction between a first extreme position and a second extreme position, second motion transfer means for moving said supporting means in a second directon between a first extreme position and a second extreme position, said second direction being angularly related to said first direction, a single drive means, and timing means operated by said single drive means and operatively coupling said single drive means to said motion transfer means for operating said motion transfer means so that said supporting means is moved in sequence by said motion transfer means from a home position to a work position.

4,002,246

APPARATUS FOR HANDLING WORKPIECES SUCH AS SEMICONDUCTOR SUBSTRATES

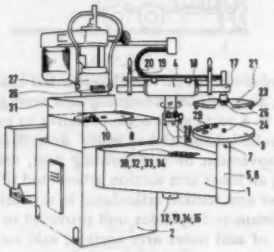
Georg Brandt, Erlangen-Dechsendorf, and Werner Kolar, Lauf, both of Germany, assignors to Georg Muller Kugellagerfabrik K.G., Germany

Filed Mar. 18, 1975, Ser. No. 559,432

Claims priority, application Germany, Oct. 30, 1974, 2451549

Int. Cl.² B25J *15/06*; B24B *7/22*

U.S. Cl. 214—1 BH 6 Claims



1. In a machine for performing operations simultaneously on a plurality of workpieces such as semiconductor substrates, the machine having a working station where the operations are simultaneously performed on the plurality of workpieces while they are situated at the work station in a common working plane respectively at predetermined locations in said plane, positioning means for preliminarily positioning the plurality of workpieces in a common positioning plane respectively at locations in said positioning plane which have with respect to each other the same relationship as said predetermined locations in said working plane, and transfer means for transferring the workpieces from said locations in said positioning plane respectively to said locations in said working plane while maintaining the workpieces during transfer thereof from said positioning plane to said working plane in a common plane which moves with the workpieces and which at the beginning of transfer coincides with said working plane, while maintaining the workpieces in said common plane at locations, respectively, which have with respect to each other the same relationship as said locations in said positioning plane and said locations in said working plane, said transfer means including a plurality of nozzles respectively situated at said locations in said common plane for respectively engaging the workpieces at said locations in said positioning plane, and means operatively connected with said nozzles for applying suction thereto for respectively holding the workpieces in engagement with said nozzles by suction during transfer of the workpieces from said positioning plane to said working plane, a base situated beneath said work station, mounting means mounting said transfer means and said positioning means on said base, and said transfer means including an upright vertically movable along and turnable angularly about a predetermined upright axis, horizontal guide means carried by said upright at an upper end thereof, an elongated horizontal arm guided by said guide means for movement back and forth along a horizontal axis perpendicular to said upright axis, and plate means carried by said horizontal arm and carrying said nozzles, said working plane, positioning plane, and common plane all being horizontal so that said plate means and nozzles

can be freely moved by movement of said arm along said horizontal axis and said upright along and around said vertical axis for placing said nozzles first in engagement with the workpieces at said positioning plane and for then transferring the workpieces to said working plane.

4,002,247

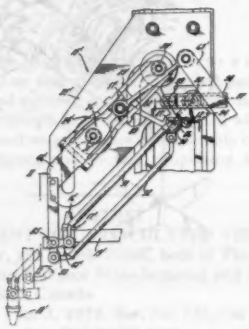
MACHINE FOR PICKING UP, TRANSFERRING, TURNING AND PLACING PARTS

Paul H. Dixon, Belvidere, Ill., assignor to Babette Dixon, Trustee of Paul H. Dixon, Trust dated Jan. 28, 1975

Continuation-in-part of Ser. No. 464,627, April 26, 1974, Pat. No. 3,921,822. This application May 27, 1975, Ser. No. 580,597

Int. Cl.² B65G *7/00*

U.S. Cl. 214—1 QA **9 Claims**



1. A parts handling machine comprising a support, transfer mechanism movable back and forth on said support and operable first to pick up a part at a loading station and then to transfer the part to and release the part at a delivery station while changing the orientation of the part during the transfer, said transfer mechanism comprising a carriage mounted on said support for back and forth movement, a pair of slots formed in said support and defining the path of movement of said transfer mechanism, each of said slots having first and second angularly related legs, said carriage having a pair of transversely extending guides received within said slots to confine movement of the carriage to the path defined by the slots, a pair of part holding jaws mounted on said carriage to move back and forth with the carriage between said loading and delivery stations and to move relative to the carriage between open and closed positions, actuator means operable when the jaws are in each station to move the jaws between its positions and thereafter operable to move said carriage on said support so as to move the jaws from one station to the other, means mounting said jaws on said carriage for turning between first and second positions, and means responsive to movement of said carriage for turning said jaws between said first and second positions as said jaws are moved between said stations.

4,002,248

MULTI-STAGE PIPE FEEDER

Walter H. Moller, 14834 NE. 11th Place, Bellevue, Wash. 98007

Filed Aug. 28, 1975, Ser. No. 608,765

Int. Cl.² E21B *19/14*

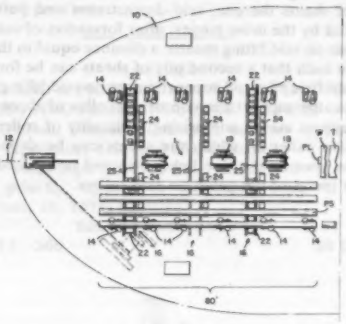
U.S. Cl. 214—1 P **14 Claims**

1. Pipe feeding apparatus for a pipe laying vessel having a pipe supplying station and, laterally spaced therefrom, pipeline tensioning means, pipeline welding means and a pipe lineup station aligned fore and aft on the vessel along a pipeline moving path, the improvement comprising:

movable, wheeled pipe carrying means having a plurality of first pipe holding devices spaced along a path laterally extending from the pipe lineup station in said pipeline moving path to said pipe supplying station,

stationary pipe carrying means having a plurality of second pipe holding devices spaced along said laterally extending path,

means for reciprocating said movable, wheeled pipe carrying means between said pipe supplying station and said



pipe lineup station for transporting pipe along said laterally extending path, and

means for alternately transferring said pipe between said second pipe holding devices and said first pipe holding devices for moving the pipe along said laterally extending path during reciprocatory movement of said movable, wheeled pipe carrying means whereby multiple pipes can be advanced simultaneously along said laterally extending path.

4,002,249

APPARATUS FOR STACKING SHEET MEMBERS

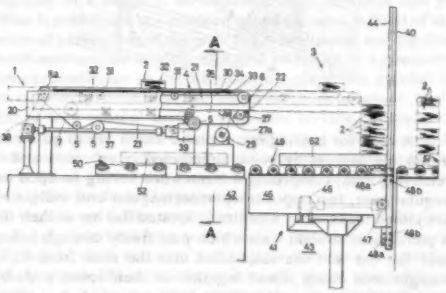
Tsutomu Shinomiya, and Eiichi Yoshino, both of Iwatsuki, Japan, assignors to Kabushiki Kaisha Tomoku, Otaru, Japan

Filed June 18, 1975, Ser. No. 587,802

Claims priority, application Japan, Aug. 29, 1974, 49-98379

Int. Cl.² B65H *29/18, 31/08*

U.S. Cl. 214—6 H **3 Claims**



1. Apparatus for stacking sheet members in a plurality of piles, said apparatus comprising: substantially horizontal conveyor means for conveying a stack of sheets thereon, said conveyor means including a downstream end portion, lifting means disposed adjacent said downstream end portion of the conveyor means for receiving sheets thereon, drive means for extending and retracting said conveyor means with respect to said lifting means, means for raising and lowering said lifting means, a stop member comprising a vertically movable plate mounted on said lifting means for movement between a raised

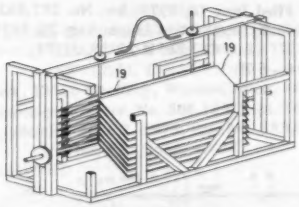
and a lowered position, said plate being downstream of said downstream end portion of the conveyor means with the latter in extended position, means for raising and lowering said stop member relative to said lifting means, said stop member in said raised position being above the level of the conveyor means so that stacks of sheets successively deposited onto said lifting means form a first pile of sheets abutting against said stop member, said lifting means having a support surface with a horizontal extent sufficient to accommodate a plurality of piles of sheets thereon, said downstream end portion being retracted by the drive means, after formation of said first pile of sheets on said lifting means, a distance equal to the width of the pile such that a second pile of sheets can be formed adjacent said first pile, and support means on said lifting means for displaceable support thereon of said piles of sheet members, said support means comprising a plurality of rollers for support of a pallet on which the sheets can be deposited, said plate in lowered position being disposed below said rollers to permit travel of the pallet on said rollers.

4,002,250

AUTOMATIC UNLOADING METAL PICKLING RACK

Frederick L. Connon, Jr., P.O. Box 88, Erieau, Ontario, Canada (N0P 1N0)

Filed Mar. 10, 1976, Ser. No. 665,640
Int. Cl.² B65G *57/03*
U.S. Cl. 214—8 **4 Claims**



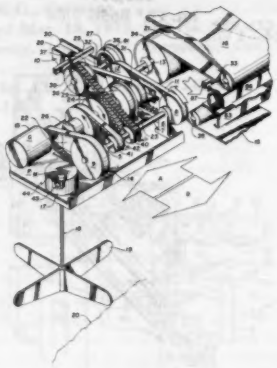
1. A rack for holding metal plates which are to go through a pickling process by being submerged in an oxide and dirt removing acid, comprising a framework having an open rectangular base, two opposite open rectangular end walls, which are joined together by a centrally located flat bar at their tops, a plurality of straight rods which pass freely through holes in said flat bar and are suspended into the rack from it, said straight rods being joined together at their lower ends by a horizontal bar, the ends of which pass through two spaced, parallel, vertical guide bars centrally located in said end wall; two spaced open side walls located on each side of said base abutting but shorter than said end walls; a series of evenly spaced notches in the inner framework of said side walls for supporting the lower edge of plates placed within the rack, these notches in one side of the rack being alternately located in relation to the notches in the opposite side of the rack; the upper edges of said plates leaning towards, and being supported by said removable rods; and a centrally located handle or loop attached to said central flat bar, by means of which the rack can be lifted.

4,002,251

PARTICULATE MATERIAL DISTRIBUTING ASSEMBLY

Ralph D. Burgess, Jr., 2800 Pheasant Road, Excelsior, Minn. 55331

Continuation-in-part of Ser. No. 439,342, Feb. 4, 1974, Pat. No. 3,877,585. This application Jan. 30, 1975, Ser. No. 545,471
The portion of the term of this patent subsequent to Apr. 15, 1992, has been disclaimed.
Int. Cl.² B65G *65/30*
U.S. Cl. 214—17 CA **15 Claims**



1. In conveying apparatus for automatically delivering material to the forwardmost unfilled portion of a bin
   a. a movable material distributing mechanism for distributing material within a bin,
   b. powered means for delivering material to said mechanism for distribution thereby,
   c. power take-off means associated with said material delivering means and providing a source of rotary power therefrom,
   d. electrically controlled moving means driven by said source of rotary power and connected with said material distributing mechanism for automatically selectively moving the latter forwardly and rearwardly,
   e. said moving means including selective drive means connected to and powered by said source of rotary power of said power take-off means and constructed and arranged with respect to the remainder of said moving means to cause said material distributing mechanism to automatically deliver material to the forwardmost unfilled portion of the bin at all times.

4,002,252

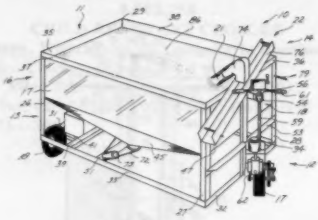
SELF PROPELLED FEED APPARATUS

Harold Beckman, Jr., 609 E. 5th St., Stromsburg, Nebr. 68666

Filed June 16, 1975, Ser. No. 587,046
Int. Cl.² B60P *1/00*
U.S. Cl. 214—83.32 **7 Claims**

1. A self propelled feed apparatus for supplying feed to a plurality of feed receptacles, said apparatus comprising:
   a frame;
   a plurality of wheels rotatably supporting said frame;
   an open topped bin for holding feed mounted in said frame;
   auger means mounted in said bin and operable to convey feed therefrom;
   adjustable chute means pivotally mounted on said frame and movable from a first position wherein feed from said auger will be conveyed by said chute means to one side of said frame, to a second position wherein the feed will be

conveyed by said chute means to the other side of said frame; said chute means including an L-shaped arm secured to said frame and extending rearwardly thereof a pair of spaced pads secured outwardly of and below said arm to said frame and an open ended chute disposed on said arm and in a first position on one of said pads, said



chute movable from said first position to a second position disposed on said arm and said other pad;

a propulsion and steering means secured to said frame and operably connected to at least one of said wheels; power means mounted on said frame and operably connected to said auger means and to said propulsion and steering means.

4,002,253

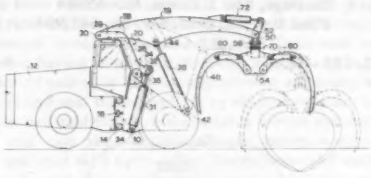
ATTACHMENT FOR ARTICULATED VEHICLE

Kenneth B. Ridler, and Frank Walsh, both of Thunder Bay F, Canada, assignors to Vesco Manufacturing and Supply Limited, Thunder Bay, Canada

Filed Feb. 3, 1975, Ser. No. 546,740

Int. Cl.² B66C *1/00*

U.S. Cl. 214—147 G **6 Claims**



2. An articulated vehicle comprising forward and rearward articulated wheel mounted members;

a boom mounted on said forward articulated member to extend forwardly therefrom;

the mounting for said boom comprising: a link structure pivotably connected adjacent its lower end to said forward articulated member about a first approximately horizontal axis;

and pivotably connected adjacent its upper end to said boom at a second axis substantially parallel to said first axis;

a controllably extensible hydraulic cylinder means pivotably connected adjacent one end to said forward articulated frame at a third axis, forwardly of said axis and substantially parallel thereto;

said hydraulic cylinder means pivotably connected adjacent its other end to said boom at a fourth axis, forwardly of said second axis and parallel thereto;

said link being dimensioned and connected to pivot between a retracted position and an advanced position;

said boom moving with said link and hydraulic cylinder means when said link is moved between retracted and extended position;

means for controlling and causing movement of said link, about said first pivot, and with it said boom;

and means fo causing extension and retraction of said cylinder;

wherein said link, boom, and hydraulic cylinder are so designed that with said hydraulic cylinder retracted and said link in the retracted position, said boom is approximately horizontal;

wherein said link and said boom are designed so that the outward end of the boom is lowered and raised, respectively, when, with the hydraulic cylinder means retracted, the link is operated from the retracted position to the extended position, and from the extended position to the retracted position.

4,002,254

METHOD AND A PICK-UP DEVICE FOR LIFTING AND MOVING SEMICONDUCTOR WAFERS

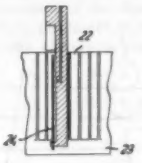
Oluf Per Olofsen, Roskilde, Denmark, assignor to Chemical Reactor Equipment A/S, Roskilde, Denmark

Filed Sept. 5, 1975, Ser. No. 610,713

Claims priority, application Denmark, Sept. 6, 1974, 4728/74; Nov. 20, 1974, 6039/74

Int. Cl.² B65G *65/04*

U.S. Cl. 214—300 **20 Claims**



1. A method for unloading individual semiconductor wafers from parallel tracks in a magazine, wherein a working member of a pick-up device operating in accordance with the Bernoulli principle is introduced into the magazine with a suspension surface forming the underside of said working member facing a wafer to be unloaded within a prescribed maximum separation from said wafer, and an air flow is ejected through a jet orifice in said suspension surface for attracting the wafer to the suspension surface without physical contact, subsequent to which the pick-up device is retracted from the magazine, whereby the wafer is prevented from leaving the suspension surface in lateral directions, wherein the improvement comprises the steps of introducing said working member into the magazine to a depth of introduction only, at which said jet orifice is positioned at a predetermined distance in front of the center of gravitation of the wafer to be unloaded and ejecting a unidirectional air flow through said jet orifice in a symmetry pian perpendicular to the suspension surface and parallel to the unloading direction and under a predetermined angle relative to a normal to the suspension surface, whereby to move said wafer relative to the suspension surface towards guide means depending from said working member at the forward end of the suspension surface before retracting the pick-up device from the magazine.

5. A pick-up device operating in accordance with the Bernoulli principle for lifting and moving a disc-shaped mechanically brittle work piece, in particular a semiconductor wafer without physically contacting said work piece, comprising a handle, a working member connected with said handle and having an underside forming a suspension surface to be positioned over the surface of a work piece, an air jet having its orifice located on said suspension surface for ejecting an air flow to create a low pressure in the space separating the suspension surface from the work piece and circumferential guide means depending from said suspension surface to prevent the work piece from leaving the suspension surface in lateral directions, wherein the improvement comprises that a single inclined air jet only has its orifice located in said suspension surface, the axis of said jet extending substantially in a symmetry plan perpendicular to the suspension surface and

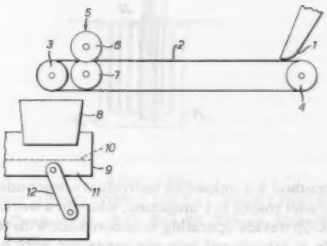
forming a predetermined angle with a normal to the suspension surface, said guide means including a protrusion forming a limiting surface at one end of said suspension surface, said limiting surface being intersected by said symmetry plan under a right angle, as well as guide means at the opposite end of said suspension surface, the axis of said inclined jet being directed toward said limiting surface, and the jet orifice being positioned on the suspension surface at such a location that the portion of the area of the suspension surface between said opposite end thereof and a line through the center of the jet orifice perpendicular to said symmetry plan corresponds to at least one third the area of the surface of a work piece to be lifted which faces said suspension surface.

4,002,255

RECOVERY OF A COMMODITY FROM A SACHET OR BAG CONTAINING THE COMMODITY

Sydney Robert Fincham, Beckenham, and Richard John Munday, Hornchurch, both of England, assignors to Tingey and Company (Engineers) Limited, London, England

Filed Apr. 4, 1975, Ser. No. 565,173
Int. Cl.² B65G 65/04
U.S. Cl. 214—305 **11 Claims**



1. Apparatus for use in the recovery of a commodity from faulty bags containing the commodity, the apparatus including:

a cutting station,

a conveyor for transporting bags towards and away from said cutting station, and

gripping means adjacent said cutting station and operatively associated with said conveyor to feed said bags into said cutting station, said gripping means comprising at least one roller and at least one pivoted mounting rotatably carrying said at least one roller, said mounting being swingable to bring said at least one roller into biased contact with said conveyor so as to be rotated thereby, said roller defining a nip with said conveyor for gripping the bags,

said cutting station comprising at least one pair of slitting wheels, each pair including opposed upper and lower slitting wheels in close face-to-face proximity, said slitting wheels of each pair having overlapping cutting peripheries operable to shear the bags when fed therebetween.

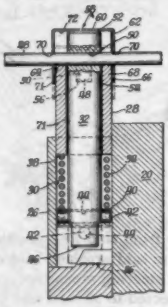
4,002,256

LIFT ASSEMBLY

Richard J. Kroboth, Garfield Heights, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Aug. 28, 1975, Ser. No. 608,489
Int. Cl.² B66F 9/14
U.S. Cl. 214—731 **5 Claims**

1. In a liftable assembly comprising a carriage liftably attachable to mast means, the carriage including a notch along an upper edge thereof; a lifter which extends generally perpendicularly forwardly from and generally upwardly and generally parallel to said carriage to adjacent an upper edge of said carriage and a member extending from said lifter over said upper edge and downwardly behind said carriage, said member including a guide sleeve extending upwardly over said upper edge and a bore coaxial with said guide sleeve and extending through said member; a lock rod slidably fitting within said guide sleeve and said bore; means for biasing said lock rod downwardly to impel a lower end thereof into said notch and means for fastening said lock rod in a fixed position



against said biasing means with said lower end removed from said notch; and improvement comprising:

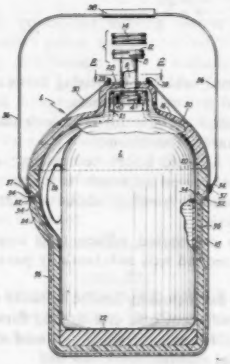
a cap affixed over an upper end of said lock rod to move therewith, said cap having a generally disc-like top with a skirt extending downwardly thereabout, an inner surface of said skirt fitting slidingly about an outer surface of said upwardly extending portion of said guide sleeve.

4,002,257

THERMAL COVER

Charles L. Hatridge, Rte. 3, Salem, Mo. 65560

Filed Dec. 18, 1975, Ser. No. 641,904
Int. Cl.² A47J 41/00
U.S. Cl. 215—13 A **9 Claims**



1. A thermally insulating cover for a jug, said jug having a threaded apertured section for pouring liquid therethrough, said cover comprising:

a. a thermally insulating upper cover portion for covering an upper part of said jug,

b. a pouring spout positioned through an aperture in said upper cover portion,

c. means for threadably securing the pouring spout to the threaded apertured section of said jug,

d. a thermally insulating lower cover portion for covering a lower part of said jug, and

e. means for releasably biasing said upper and lower portions together whereby said jug is substantially surrounded by said upper and lower cover portions.

4,002,258

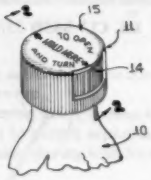
CHILD RESISTANT CLOSURE

John J. Curry, Westchester, Ill., assignor to Plastisonics Company, Inc., Chicago, Ill.

Filed Feb. 20, 1976, Ser. No. 659,912

Int. Cl.² B65D *55/02, 85/56;* **H61J** *1/00*

U.S. Cl. 215—206 **8 Claims**



1. A child-resistant closure assembly for a container of the type including a neck finish adapted to have rotationally removed therefrom a closure, said closure assembly comprising a closure member and an overcap telescoped over said closure member, said closure member including a closure panel and a skirt connected to said closure panel, means on the interior of said skirt for interlocking with a container neck finish, said overcap including an end panel overlying said closure panel, a sleeve connected to said end panel and telescoped over said skirt, and a radially inwardly directed flange on said skirt remote from said end panel, said end panel and said flange having retained therebetween said closure member restraining said closure member against separation from said overcap, said sleeve having an internal diameter in excess of an external diameter of said skirt to normally provide a spacing between said skirt and said sleeve facilitating relative rotation between said skirt and said sleeve, interlockable means carried by said sleeve and said skirt for rotationally interconnecting said sleeve and said skirt upon radial displacement of said sleeve relative to said skirt, said sleeve having a finger receiving window therethrough diametrically opposite to said interlockable means for facilitating the manual radial displacement of said sleeve into rotational interlocking engagement with said skirt in response to the manual gripping of said skirt and said sleeve at diametrically opposite points.

4,002,259

SAFETY CLOSURE

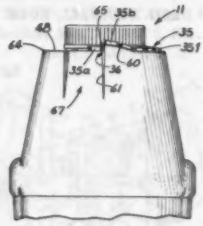
Milton L. Geiser, Millersville, Pa., assignor to Kerr Glass Manufacturing Corporation, Los Angeles, Calif.

Filed Oct. 6, 1975, Ser. No. 620,221

Int. Cl.² B65D *55/02, 55/56;* **A61J** *1/00*

U.S. Cl. 215—216 **9 Claims**

1. A container and a closure comprising, in combination, a fastening means on the container, a fastening means on the closure for securing the closure to the container and for bringing portions thereof into closed and sealed engagement with said container to prevent leakage of the container contents, a single detent member on said container, a series of individual detent members formed on the said closure closely adjacent each other in a circumferential direction each for individual abutment with said container detent member, said detent members on said closure having a limited arcuate extent and each adapted for deflection by the cooperating detent member on said container when the closure is being secured, the degree of turning of the closure required to effect the closed and sealed engagement of the closure with the container determining which of said closure detent members have been deflected, an abutment wall on each of said closure detent members positioned for abutting said single container detent member after having been deflected thereby to lock said closure against removal, said abutment walls being spaced by about 15° from each other, said detent members being spaced



by gaps of several degrees extending between adjacent walls of adjacent detent members, and means on said closure detent members for permitting individual manual manipulation thereof to allow displacement of the closure detent members to positions to move their abutment walls past the container detent member when the closure is turned in the removal direction.

4,002,260

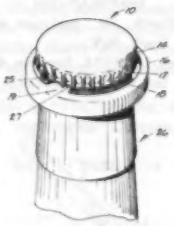
PRY-OFF CLOSURE

Jackie A. Coop, New Lisbon, Ind., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Sept. 25, 1975, Ser. No. 616,569

Int. Cl.² B65D *41/12*

U.S. Cl. 215—305 **3 Claims**

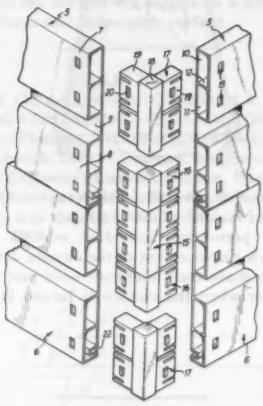


1. In a container-closure combination including a container having an upwardly projecting substantially cylindrical neck portion with an entrance mouth therein and an externally disposed bead around the neck portion adjacent the entrance mouth and a sheet metal closure secured on the container including a top panel over the container entrance mouth, a depending skirt around the periphery of the top panel, said skirt including a plurality of flutes securing the closure on the container and a substantially rigid pull ring disposed generally beneath the bottom edge of said skirt substantially concentric with the skirt and integrally connected to said skirt, said pull ring comprising a bead curled inwardly from the connection of the ring to said skirt and disposed adjacent the container neck below the ring connection to the closure skirt to be cammed against the container neck when the ring is pivoted to partially wrap the end of said skirt around a portion of the curled bead and initiate expansion of at least some of said flutes and allow said closure to be lifted off of said container.

4,002,261
CONSTRUCTION OF PANELS, ENCLOSURES OR CONTAINERS

Leon George Litchfield, Youlgreave, England, assignor to L.B. (Plastics) Limited, Belper, England

Filed Oct. 29, 1975, Ser. No. 626,968
Claims priority, application United Kingdom, Oct. 30, 1974, 46910/74
Int. Cl.² B65D 7/00, 7/42; E04B 1/00
U.S. Cl. 220—80 16 Claims

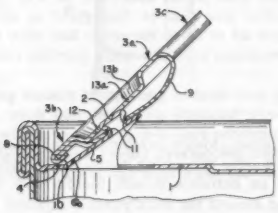


1. A panel constituted by at least two panel members disposed edge to edge and each having cavities in the ends thereof, the panel members being interconnected at at least one end by a connecting member having spigot formations engaged in said cavities such that the connecting member bridges the panel members and retains same in abutment with one another to form the panel.

4,002,262
VENTED EASY-OPEN END CLOSURE WITH ANTI-TEAR MECHANISM

Nick S. Khoury, Worth, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed May 10, 1976, Ser. No. 684,684
Int. Cl.² B65D 41/32
U.S. Cl. 220—271 9 Claims

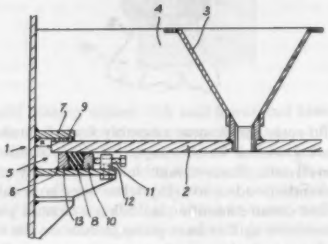


1. An improved easy-open end closure of the type comprising an end panel and a pull tab, said end panel having an opening score line defining an opening flap therein, said flap having a vent score line defining a vent therein, said vent score line including distal end portions spaced apart from said opening score line, said pull tab comprising a body including a nose portion and a grasping portion; the improvement comprising force-redirecting attachment means attaching said pull tab to said flap whereby tearing of the end panel portions between said opening score line and said distal end portions is prevented, said attachment means including means including a tether integrally connected to said pull tab intermediate said portions, said tether being folded under said pull tab body and toward said nose portion and secured to said flap by said attachment means, whereby said pull tab body is displaceable prior to rupture of said opening score line to a position relative to said end panel whereat the stress loading on said end panel in the areas immediately adjacent said distal ends of said vent score line is primarily in tension and the stress components thereon normal to said end panel are substantially reduced.

4,002,263
LEAKPROOF MOUNTING DEVICE FOR THE SUPPORT PLATE OF A FLUIDIZATION REACTOR GRID

Robert Marcellini, Freyming-Merlebach, France, assignor to Charbonnages de France, Paris, France

Filed June 6, 1975, Ser. No. 584,414
Claims priority, application France, June 11, 1974, 74.20106
Int. Cl.² B65D 53/06
U.S. Cl. 220—378 2 Claims



1. A leakproof mounting device for a support plate of a grid of a fluidisation reactor comprising
a one piece grid support plate,
a peripheral bracket mounted inside the reactor on its inside peripheral surface,
a peripheral ring also mounted inside the reactor on its wall spaced from said bracket forming an annular space bounded in height by said peripheral ring and said peripheral bracket, and by an inner wall of the reactor between said ring and said bracket,
annular seals respectively disposed on both sides of said plate in annular spaces separating said plate from said bracket and said ring,
said lower seal and said bracket supporting said plate with a slight radial clearance relative to the inside wall of the reactor,
means to clamp said lower seal to expand said lower seal in its direction between said plate and said bracket,
said clamping means including
wedges which are substantially contiguous annular segments along a circumference of said lower seal, and
clamping screws located to clamp said lower seal against said wedges.

4,002,264
DISPENSING MEANS FOR MOIST TISSUES

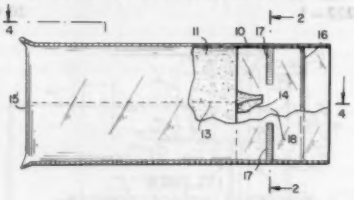
Cesare N. Marchesani, Union City, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Jan. 30, 1975, Ser. No. 545,368
Int. Cl.² B65H 49/02
U.S. Cl. 221—63 6 Claims

1. A package of moist tissues comprising:
a. a flexible bag having a closed end and a dispensing end,
b. a plurality of separably interconnected liquid impregnated tissues in the form of a flattened coreless roll having an oval cross section,
c. said bag being elongated and closely conforming to the shape of said roll,
d. a reclosable closure disposed at said dispensing end and,

e. restricting means for facilitating separation of said tissues disposed between said reclosable closure and said tissues,

f. said restricting means including two sealed strips extending inwardly from opposed outer edges of said bag to define a centrally located opening for the passage of said tissues from inside of said roll,



g. said tissues being separably interconnected by lines of weakness therebetween,

h. the size of said opening being chosen to provide sufficient drag to said tissues to permit separation of said tissues at said lines of weakness during withdrawal from said package.

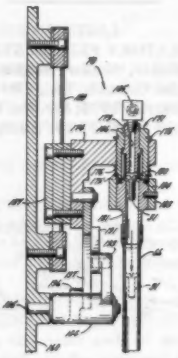
4,002,265
APPARATUS FOR PNEUMATICALLY DELIVERING PARTS

Paul H. Dixon, Belvidere, Ill., assignor to Babette Dixon, Trustee of Paul H. Dixon, Trust dated Jan. 28, 1975, Belvidere, Ill.

Division of Ser. No. 517,920, Oct. 25, 1974, Pat. No. 3,929,176. This application June 6, 1975, Ser. No. 584,479

Int. Cl.² B65G 51/02

U.S. Cl. 221—210 **4 Claims**



1. Apparatus for delivering a part to an automatic part driving machine, said apparatus comprising a tube leading to said machine and having an open part-receiving end, a member having a part-holding device, said member being mounted for movement between a first position in which said holding device is spaced from the end of said tube and a second position in which said holding device is contiguous the end of said tube, said member establishing a substantially air-tight seal at the end of said tube when in said second position said member including a bore which is alined with said tube in all positions of said member, said holding device comprising a resiliently yieldable sleeve telescoped into and secured within said bore and adapted to telescope over and resiliently grip a part, mechanism for placing a part in said sleeve when said member is in said first position, means for moving said member to said second position after a part has been placed in said sleeve, and means for thereafter delivering pressurized air into said member to blow said part out of said sleeve and into and through said tube for delivery to the part driving machine.

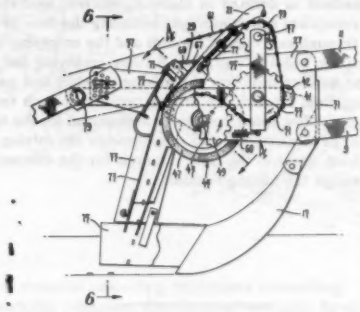
4,002,266
SEED DECELERATING DEVICE

Raymond A. Beebe, Detroit, Mich., assignor to Massey-Ferguson Inc., Detroit, Mich.

Continuation of Ser. No. 280,682, Aug. 14, 1972, abandoned. This application Jan. 28, 1974, Ser. No. 437,432

Int. Cl.² B65H 5/22

U.S. Cl. 221—260 **11 Claims**



1. Apparatus for conveying seed from a seed dispenser to the ground and for reducing the velocity of moving spaced seeds prior to impact of said seeds on soil including conveyor means for conveying seed in moving air at a given velocity, means for positively lowering the given velocity of said seeds and passing the seeds along a path at a velocity less than said given velocity and openings for the escape of at least a portion of the air in which the seed is carried to the means for positively lowering the velocity of the seeds.

4,002,267
METHOD AND APPARATUS FOR PREPARING PHOTOPROCESSING SOLUTIONS, AND THE LIKE

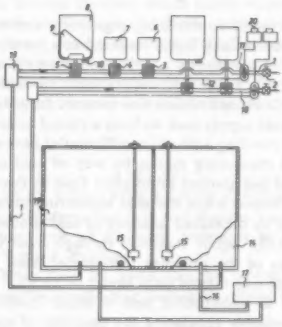
Marcel Aelterman, Mortsel; Gustaaf De Loucker, Berchem; Leo Van Bouwel, Mortsel; Emile Stievenart, Mortsel; Horst Köninger, Munich; Helmut Schausberger, Unterhaching; Franz Ertl, Munich; Horst Röhr, Garching, and Erwin Geyken, Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed May 8, 1974, Ser. No. 468,170

Claims priority, application Germany, May 8, 1973, 2323160

Int. Cl.² B67D 5/14

U.S. Cl. 222—1 **48 Claims**



1. A method of mixing at least one liquid chemical concentrate with a thinning fluid to form a predetermined amount of

a mixture or solution having a predetermined composition, particularly for use in photographic processing, comprising, in combination, the steps of placing a predetermined amount of said at least one liquid concentrate into at least one respective holding unit; substantially completely emptying the contents of the holding unit into a mixing conduit leading to a supply tank while passing thinning fluid through the mixing conduit; and terminating the flow of thinning fluid through the mixing conduit when the amount of thinning fluid which has been passed through the mixing conduit reaches an amount corresponding to said predetermined amount of said concentrate and to said predetermined composition.

11. A method as defined in claim 1, wherein said step of emptying comprises simultaneously initiating the flow of thinning fluid through said mixing conduit and the emptying of the contents of the holding unit, and further emptying the contents of the holding unit into the mixing conduit and passing the thinning fluid through the mixing conduit at such respective volumetric flow rates that the time required for the requisite amount of thinning fluid to pass through the mixing conduit is at least equal to the time required for the concentrate to pass through the mixing conduit.

4,002,268

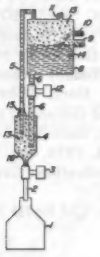
VOLUMETRIC FILLING SYSTEM

Harold D. McKinney, Rte. 4, Box 404, Pine Bluff, Ark. 71601

Filed Mar. 19, 1975, Ser. No. 559,859

Int. Cl.² G01F *11/28*

U.S. Cl. 222—1 **12 Claims**



1. The process of controllably regulating and depositing a quantity of substantially liquid material in a measuring means from a material containing supply tank wherein at least one feed line extends from said supply tank to said measuring means and at least one return line extends from said measuring means to said supply tank to form a closed loop comprising the steps of: providing a pressure differential between the said tank and said measuring means by way of said substantially liquid material and another immiscible fluid so that said differential is nonexistent when the said measuring means substantially contains its measured amount of said material, flowing said substantially liquid material through said closed loop system by way of the pressure differential from said supply into said measuring means until said

differential is nonexistent and a static condition exists, thereby controllably regulating the quantity of said material; interrupting the loop system and emptying said measuring means of the material therein; completing the loop and repeating said flowing and interrupting steps.

4,002,269

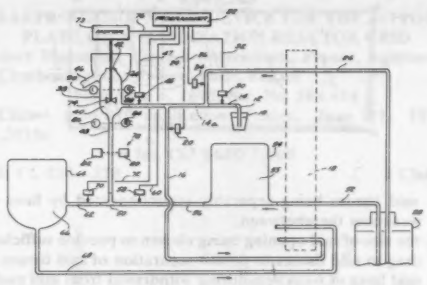
LIQUID PROPORTIONING SYSTEM IN A LIQUID SAMPLE ANALYZER

Kent M. Negersmith, Carmel, N.Y., assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Continuation-in-part of Ser. No. 498,015, Aug. 16, 1974, abandoned. This application Apr. 2, 1975, Ser. No. 564,583

Int. Cl.² B67D *5/60*; G01N *31/22*, *33/16*

U.S. Cl. 222—1 **20 Claims**



1. A method of proportioning liquids in a fluid sample analyzer, comprising the steps of:

filling a first chamber of fixed-volume with a first liquid;

filling a second larger chamber of fixed-volume with a second liquid to be combined with said first liquid;

displacing the volume of said first liquid in said first chamber into said filled second chamber, using a quantity of said second liquid as a pilot liquid; and

exhausting concurrently a volume of said second liquid by overflow from said second chamber equal to said volume of said first liquid and any pilot fluid introduced into said second chamber.

4,002,270

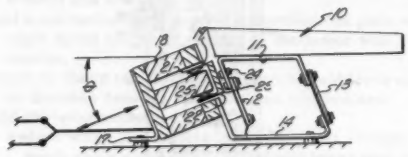
VIBRATORY FEEDER SYSTEM

Robert Leopold Reiner, Shaker Heights, Ohio, assignor to Cleveland Machine Controls, Inc., Cleveland, Ohio

Filed May 2, 1975, Ser. No. 574,344

Int. Cl.² B65G *27/24*; H02K *33/02*

U.S. Cl. 222—58 **17 Claims**



1. A vibratory feeder system comprising:

a vibratory feeder including a tray for receiving product to be conveyed along and then discharged therefrom,

a driver unit for imparting reciprocal vibratory motion to said tray to convey product including electromagnetic driver means coupled to said tray for imparting drive forces thereto to achieve tray velocity,

driver control means for controlling said driver unit and including circuit means for applying drive current to said driver means to provide said drive forces in proportion to the magnitude of said drive current and means for providing a tray velocity signal having a magnitude dependent upon said tray velocity and means for varying the magnitude of said drive current in dependence upon the value of a velocity reference signal to thereby adjust the tray velocity; and,

product density control means for controlling the rate of discharge of product from said tray and including means

for providing a product weight signal representative of the weight of the product in said tray as a function of the magnitude of said drive current, and means for varying said velocity reference signal dependent upon the magnitude of said product weight signal.

4,002,271

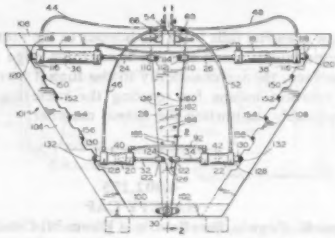
PROPORTIONING SYSTEMS

Erville C. Buck, Springfield, Oreg., assignor to The Willamette Valley Company, Eugene, Oreg.

Filed May 21, 1975, Ser. No. 579,509

Int. Cl.² B67D *5/64*

U.S. Cl. 222—134 **7 Claims**



1. In a proportioning system,

a frame,

a lever pivotally connected at one end thereof to the frame for pivotal movement about a fulcrum point,

a first pair of double-acting cylinder pumps each of a predetermined diameter and each including a cylinder and a piston,

the frame including a pair of arms on opposite sides of the fulcrum point,

means connecting the outer ends of the cylinders pivotally to the arms and rods of the pistons pivotally to the lever at opposite sides of the lever and at equal distances from the fulcrum point to mount the cylinder pumps in opposed positions,

a second pair of cylinder pumps each of a predetermined diameter and each including a cylinder and a piston,

means connecting the outer ends of the cylinders of the second pair pivotally to the arms and rods of the pistons of the second pair pivotally to the lever at opposed sides of the lever and at equal distances from the fulcrum point, the last-mentioned distances being a predetermined proportion of the first-mentioned distances,

first supply means forming a source of a first liquid under pressure,

second supply means forming a source of a second liquid under pressure,

mixing means,

and valve means for alternately connecting the first supply means to the outer ends of the first pair of cylinders and connecting the outer ends of the first pair of cylinders alternately to the mixing means and for alternately connecting the second supply means to the outer ends of the second pair of cylinders and connecting the outer ends of the second pair of cylinders alternately to the mixing means.

4,002,272

MATERIAL UNLOADING IMPLEMENTS

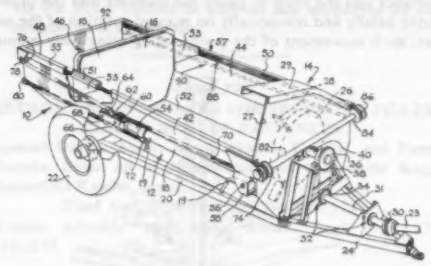
Alexander Crawford, Guy's Cliff, and Alfred J. Bailey, Coventry, both of England, assignors to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

Filed May 8, 1975, Ser. No. 575,896

Claims priority, application United Kingdom, May 10, 1974, 20667/74

Int. Cl.² B67D *5/08*; **A01C** *19/00*

U.S. Cl. 222—392 **8 Claims**



1. A material unloading implement comprising:

a material container, the material container having a material unloading station; a material pushing member which can be mounted on the material container for movement towards the material unloading station to move material within the container towards the unloading station; a thrust device actuable by fluid pressure; and thrust transmission means to transmit thrust from the thrust device to the material pushing member to move the material pushing member towards the material unloading station, wherein the thrust transmission means comprises a flexible tension member, there being also provided a training member around which the flexible tension member can be trained, whereby in use the flexible tension member draws the material pushing member towards the training member, a further training member on the implement at a position spaced from said training member and the flexible tension member trained round said training member and said farther training member with at least one end of the tension member fastened to another portion of the tension member to form a closed loop having two runs extending between the training members, the tension member being coupled to the material pushing member in one of the runs and being coupled to the thrust device in the other run through a velocity change device whereby a given degree of movement of the thrust device causes more than said given degree of movement of the tension member, said velocity change device including a further flexible tension member which passes round at least one wheel mounted so as to be displaceable under the action of the thrust device, the further flexible tension member having one end connected to said other run of the tension member and its other end anchored, and wherein at least one of the training members drivably engages the tension member.

4,002,273

DISPENSE HEAD FOR LIQUID CONTAINERS

Cyril George Golding, Sedgley, and Eugene Leonowicz, Wolverhampton, both of England, assignors to GKN Sankey Limited, Telford, England

Filed Aug. 29, 1975, Ser. No. 609,027

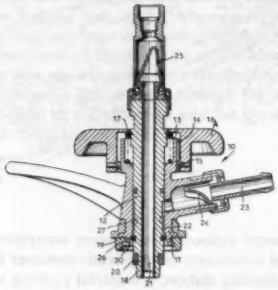
Claims priority, application United Kingdom, Sept. 3, 1974, 38364/74

Int. Cl.² B65D *83/06*

U.S. Cl. 222—400.7 **1 Claim**

1. A dispense head for a liquid container of the type used for

dispensing liquid under a pressure derived from a supply of gas, the container having an outlet fitting which includes a pair of coaxially disposed valves controlling the inlet of gas and the outlet of liquid respectively, both valves being openable by insertion of a probe into the fitting, the dispense head comprising a body adapted to be secured to the container outlet fitting and a probe mounted in the body, the dispense head defining respective passageways for gas and liquid, the probe being keyed for axial and rotational movement to a manually rotatable member mounted for rotation relative to the body, cam means being provided between the manually rotatable member and the body to cause the member and the probe to move axially and rotationally on manual rotation of the member, such movement of the probe being selectively manually



operable independently of the action of attaching the body to the container, and a gas shut off valve being provided in the gas passageway adapted to close the passageway when the probe is in the withdrawn condition and to open it when the probe is in the extended position, said gas passageway being defined between the exterior of the probe and a conical counterbore formed in the interior of the body, the probe having an annular groove defined in its exterior and surrounding the probe, and said gas shut off valve comprising an O-ring provided in said groove and co-operable in the withdrawn position of the probe with the interior surface of the counterbore to close the gas passageway and spaced from the interior surface of the counterbore in the extended position of the probe.

4,002,274

PARTICULATE MATERIAL FEEDER FOR HIGH TEMPERATURE VACUUM SYSTEM

Dale W. Rice, Horseheads, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 537,042, Dec. 27, 1974, Pat. No. 3,960,503. This application Dec. 22, 1975, Ser. No. 643,349

Int. Cl.² B65G *65/48;* **G01F** *11/20*

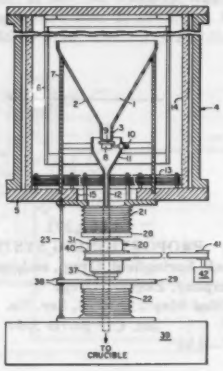
U.S. Cl. 222—410 **3 Claims**

1. A particulate raw material feeder mechanism for delivering the material at a constant rate to a processing area, which mechanism comprises:

A. a raw material hopper having an inlet opening at the top thereof for receiving raw material and an outlet opening at the bottom thereof for discharging raw material,

B. a rotatable funnel member located substantially axially beneath the hopper outlet opening for receiving raw material discharged thereform, and including conduit means extending axially downwardly from the funnel member for transporting discharged raw material a distance away from the hopper to the processing area,

C. metering means mounted on the funnel member for rotation therewith and for rotation relative to the hopper outlet opening, positioned substantially axially to the outlet opening and above the receiving means, and having a flat upper surface positioned at such a distance below the hopper outlet opening and being of such size relative thereto that when the metering means is stationary, the raw material falls from the hopper and accumulates on the metering means upper surface, and when rotating, the



raw material falls from the hopper to the metering means upper surface and steadily flows to an edge of the upper surface, thence constantly to the funnel member, and

D. rotation means for rotating the metering means and rotatably supporting the funnel member.

4,002,275

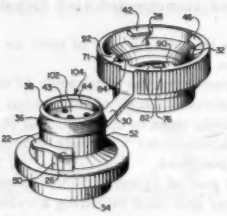
SAFETY CAP

William G. Crowle, Deerfield, and Efrem M. Ostrowsky, Highland Park, both of Ill., assignors to VCA Corporation, Baton Rouge, La.

Filed Nov. 12, 1975, Ser. No. 631,033

Int. Cl.² B67D *5/06*

U.S. Cl. 222—543 **16 Claims**



1. A safety dispensing cap for fluid containers comprising:

a. a tubular discharge member, having an opening for discharging said fluid from said container and having container attachment means for attaching said tubular discharge member to said container;

b. a tubular closing member, for attaining a rotating, overlying, removable fit onto said tubular discharge member, said tubular closing member having a sealing means for sealing said opening when said fit is attained and said tubular closing member and said tubular discharge member having attaching means for attaining said fit, said attaching means comprising an undercut annular, outwardly extending conical closing bead carried by said discharge member and an undercut annular groove carried by said closing member, said groove snappingly receivable of said bead to attach said closing member to said discharge member;

c. a first latching lug connected to said tubular discharge member, said first latching lug being overlaid by said tubular closing member when said fit is attained;

d. a second latching lug in the interior of and connected to said tubular closing member, said second latching lug cooperating with said first latching lug to lock said members together when said second latching lug underlies said first latching lug; and

e. tab means connected to said tubular closing member for rotating said tubular closing member to lock and unlock the members and for pulling said tubular closing member from said tubular discharge member when said members are unlocked.

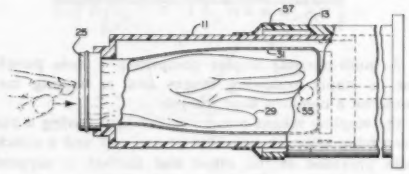
5. The cap of claim 1 wherein said discharge member and said closing member are permanently connected one to the other by means of a hinge.

6. The cap of claim 5 wherein said hinge is a resilient strap.

4,002,276
SURGICAL GLOVE DONNING SYSTEM

Mark P. Poncy; George W. Poncy, and Richard P. Poncy, all of 3670 E. Indus. Way, Riviera Beach, Fla. 33404

Filed Aug. 1, 1975, Ser. No. 600,893
Int. Cl.² A47J 51/06
U.S. Cl. 223—111 **10 Claims**

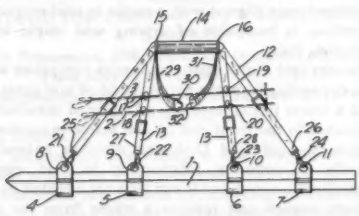


1. A method of donning a glove comprising mounting said glove on a ring by stretching the cuff portion of said glove around the end edge of said ring to open the cuff portion of said glove for entry of the hand, then inflating said glove, inserting the hand into said glove while inflated, then deflating said glove around said hand and releasing the cuff portion of said glove from said ring by exerting air pressure between said cuff portion and said ring to explode said cuff portion off of said ring.

4,002,277
SKI TOTE DEVICE

Wayne P. Westerholm, Redondo Beach, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed May 14, 1975, Ser. No. 577,435
Int. Cl.² A45C 71/00
U.S. Cl. 224—45 S **1 Claim**



1. A ski tote device for carrying skis and ski poles, said ski tote device comprising

a plurality of sling type members each supporting skis in spaced relation with the other sling type members and each comprising a strip of flexible material having bores formed through both ends so that when the strip supports skis as a sling the bores are in alignment;

a handle of substantially tubular configuration;

a pair of straps passing through the handle and extending from the handle at both ends, each of the straps having spaced opposite first and second ends, each of the straps comprising an adjustable strap, one of said straps having a plurality of holes formed therethrough in positions whereby ski poles are supported by said one of the straps via the holes and the handle; and

fastening means at the first and second ends of each of the straps for releasably fastening each end of each of the straps to a corresponding one of the sling type members via the bores thereof to support skis supported by said members via the handle.

4,002,278
METHOD AND APPARATUS FOR FEEDING A FILLER CORD FOR SLIDE FASTENERS

Shigenori Omori, Uozu; Isamu Maeda, Kurobe, and Fumio Terada, Uozu, all of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Aug. 27, 1975, Ser. No. 608,172
Claims priority, application Japan, Sept. 5, 1974, 49-102237
Int. Cl.² B65H 17/22
U.S. Cl. 226—1 **5 Claims**

1. A method of feeding a filler cord through a coiled slide fastener element being formed by winding a filament about an axis generally coincident with the direction the filler cord is fed through the coiled fastener element, which method comprises the steps of directing the filler cord along a path of longitudinal movement extending from a source of filler cord supply to and along said axis, said path having a loop portion, gripping and engaging the cord at said loop portion of the path to drive the cord longitudinally along said path; and adjusting the rate of driving said cord in accordance with the winding rate of said filament whereby the rate at which the cord is fed through the coiled fastener element corresponds to the rate of formation thereof as established by said winding rate.

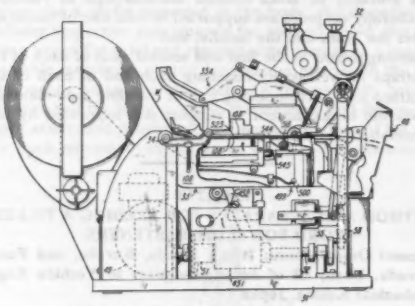
4,002,279
RECORD FEEDING APPARATUS AND METHOD

Rudolph J. Klein, Centerville, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Dec. 30, 1974, Ser. No. 537,481
Int. Cl.² B65H 23/18
U.S. Cl. 226—2 **11 Claims**

9. The method of transporting a record through a transport mechanism untilizing a drive mechanism which includes a stepping motor having an incrementally rotatable drive shaft and a plurality of windings, comprising the steps of: alternately energizing the stepping motor windings in a predetermined

sequence and at a predetermined sequencing rate thereby incrementally rotating the drive shaft at a predetermined rate for transporting the record at a first predetermined speed; gradually increasing the sequencing rate for gradually accelerating the record to a second speed; thereafter gradually decreasing the sequencing rate for decelerating the record; and terminating the sequencing to stop the rotation of the drive shaft and the movement of the record.

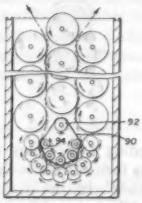


4,002,280

FILM TRANSPORT APPARATUS UTILIZING ROLLERS TO PROVIDE A U-PATH

Kenneth R. Coleman, Warren; Hans G. Steinebach, Hackensack; H. Werner Waden, Paramus, and Paul Zamek, Westwood, all of N.J., assignors to Colenta American Corporation, Paramus, N.J.

Filed May 12, 1976, Ser. No. 685,761
Int. Cl.² B65H *17/22*
U.S. Cl. 226—171 **17 Claims**



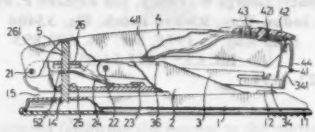
11. A transmitting apparatus for film, paper and rolls and the like and providing for an automatically advanced sheet in a U-path through and from a tank of selected size, said path being downward and upward with no squeezing action on the sheet material, said transport including: (a) a redirecting sheet transport assembly provided at the terminal end of a first transport path and when the sheet material has entered this redirecting transport a U-turn path is provided and at the end of this U-turn path the sheet material is discharged to a second path, this redirecting transport apparatus including an inner guideway providing a powered transporting surface and providing a curved path by which that sheet material in contact with the transporting surface is moved forwardly at a determined speed and there is in association with this inner guideway an outer guideway provided by a multiplicity of small rollers arranged in a U-shaped pattern and powered to provide transporting means, the rollers carried in a spaced array and on a common shaft as assemblies, each shaft assembly having a multiplicity of similar small rollers, these assemblies in mounted and driving condition having the roller assembly on one shaft fitting into the space portions on an adjacent shaft to provide an intermeshed arrangement whereby the driving transport surfaces provided by the intermeshed rollers are approximately one-half the diameter of the small rollers carried on these shafts, the outer small rollers spaced from the inner curved guideway so that at least one-sixteenth of an inch between the inner and outer contact transporting surfaces is maintained, (b) gear driving means carried on and secured on the shafts carrying the rollers so that the rollers are driven at a speed where the sheet material is transported at a selected speed at all positions in this U-turn transport apparatus, and (c) power transmitting means connected to the shafts of at least one roller to drive all the shafts at selected speeds.

4,002,281

MULTI-PURPOSE STAPLER

Sheau-Po Hsu, Hu Wei Town, China /Taiwan, assignor to Eic International Corporation, Taipei, China /Taiwan

Filed Dec. 4, 1975, Ser. No. 637,663
Int. Cl.² B25C *11/00*
U.S. Cl. 227—63 **3 Claims**



1. A multi-purpose stapler comprising a hole punching means, a staple removing means and a stapling means mounted on a common base wherein

A. the stapling means comprises the base having a punch receiving aperture provided at one end and a clinching die provided at the other end thereof, a supporting bracket having a front portion fixedly mounted on said base, a middle portion, and a rear portion having a hole in the bottom thereof and spaced from said base to provide for insertion of material to be punched, a press handle pivotally mounted to said rear portion of said supporting bracket having a longitudinal slot in a front portion thereof, a button slidably mounted on said press handle and having an integral protrusion which extends into said slot, a staple magazine pivotally mounted to said middle portion of said supporting bracket, a stapling blade having a vertical staple driving portion and rearwardly extending horizontal portion secured to said integral protrusion of said button whereby upon movement of said button to a rearward position the stapling blade is aligned with a foremost staple positioned in the staple magazine above the clinching die, thereby upon depression of said press handle a staple is driven out of said magazine into material placed over said clinching die and clinched by said clinching die, and upon movement of said button to a forward position the stapling blade, when in its forward position is not aligned with a staple in said magazine and therefore is incapable of driving said staple into said material, and;

B. wherein said staple removing means comprises an upper jaw depending from the forward end of said press handle, and a lower jaw comprising a U-shaped member fixedly mounted to the front end of said staple magazine with a mid-section of said U-shaped member extending upwardly in opposing relationship to said upper jaw whereby the upper and lower jaws are adapted to cooperatively engage and remove a staple from the material upon the application of pressure to the press handle in the direction of the base when said button is in said forward position and

C. wherein said hole punching means comprises a bearing plate fixedly mounted to said rear portion of said support bracket and having a hole which is vertically aligned with said hole in the bottom of the rear portion of the support bracket and with said punch receiving aperture in said

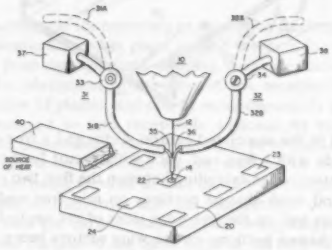
base, a spring strap the forward end of which is secured to said support bracket and the other end of which has a fork-like configuration and, a punch rod slidably received in the holes of said bearing plate and support bracket, and having a circular groove adapted to receive the fork-like configuration of said spring strap, said punch rod being slidably engaged by said press handle whereby the lower end of the punch rod passes through the punch receiving aperture upon the application of pressure to the press handle to punch a hole in material inserted into said space between the base and said rear portion of said support bracket.

4,002,282

INSULATION OF MICROCIRCUIT INTERCONNECTING WIRES

Francis J. Murdoch, Monmouth Beach, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 25, 1976, Ser. No. 670,302
Int. Cl.² H01L *21/60*
U.S. Cl. 228—4.5 **9 Claims**



1. A device, for insulating a wire issuing from an orifice, comprising:

at least two capillary tubes pivotably mounted to the structure surrounding said orifice;

means for moving said capillary tubes to a first position wherein the outlets of said capillary tubes oppose each other on opposite sides of said wire just below said orifice;

at least one source of liquid, adhesive, insulating material;

means for connecting the inputs of said capillary tubes to said source of liquid, adhesive, insulating material; and

means for expressing said liquid, adhesive, insulating material from said capillary tubes to converge around said wire as it is drawn from said orifice to provide an insulation along any desired length of said wire.

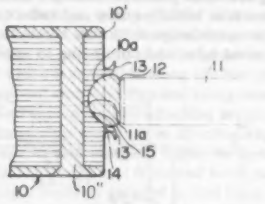
4,002,283

METHOD FOR REINFORCING A LOAD-BEARING SURFACE

Tikahiro Nonoyama, 3984-148, Aza-Iwagane, Aichi, Japan

Filed May 6, 1975, Ser. No. 575,115
Claims priority, application Japan, June 25, 1974, 49-72581
Int. Cl.² B23K *21/00*
U.S. Cl. 228—112 **3 Claims**

1. A method for reinforcing a load-bearing surface of a laminated plunger in a solenoid, including a step to rotate one of said laminated plunger and a reinforcing material relative to the other, a step to contact the reinforcing material with the load-bearing surface formed by the side edges of the laminated silicon steel plates of said plunger, a step to apply an initial pressure, sufficient to make the reinforcing material penetrate into said laminated plunger, between said reinforcing material and said plunger, a step to reduce said initial pressure so long as the melting of both said reinforcing material and said laminated plunger is possible, a step to weld frictionally the contacting surfaces of said reinforcing material and said laminated plunger with the frictional heat generated in the contacting portions of said reinforcing material and said



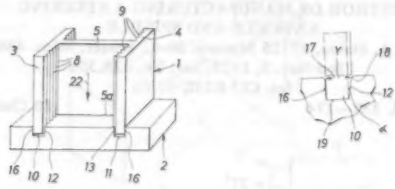
laminated plunger, and a step to stop the relative rotation to cool and coagulate the welded portion.

4,002,284

METHOD OF MAKING A COLD WELDED CONNECTION

Heinz F. W. Suppus, Meschede, Germany, assignor to Metall-Werk Merkur GmbH, Velmede, Germany

Continuation of Ser. No. 266,542, June 27, 1972, abandoned.
This application Dec. 13, 1974, Ser. No. 532,712
Claims priority, application Germany, June 29, 1971, 2132139
Int. Cl.² B23K *21/00*
U.S. Cl. 228—115 **9 Claims**



1. The method of connecting two light metal members which comprises: forcing one portion of one member into a groove in the other member, in which the one portion is of greater transverse dimension between opposite engaging surfaces than the corresponding dimension of said groove, the opposite engaging surfaces on one member converging in the direction of movement of said one portion into said groove, and at least one engaging surface of said portion and groove has a plurality of ribs extending in the direction of movement of said portion into said groove, said ribs being adapted to engage a complementary surface on the other member, the height of said ribs being substantially greater than the amount of convergence of said converging surfaces, said ribs removing any light metal oxidation coating on the corresponding engaging surface and being deformed under pressure as said portion is forced into said groove to cold weld said members together.

4,002,285

METHOD OF METALLURGICALLY JOINING TUBING

Michael E. Wendt, Tyler, Tex., assignor to General Electric Company, Louisville, Ky.

Filed Mar. 24, 1976, Ser. No. 670,062
Int. Cl.² B23K *31/02*
U.S. Cl. 228—141 A **3 Claims**

1. The method of joining tube members comprising:

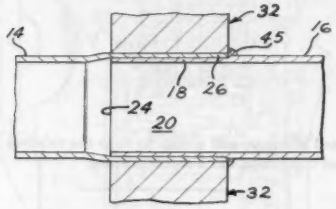
providing a first tube having an end portion adapted to receive the end portion of a second tube with radial clearance between the contiguous surfaces to be joined;

coating at least one of the surfaces to be joined with a layer of solder;

telescoping the end portions so that the contiguous surfaces to be joined are oppositely disposed;

applying a heated crimping means having a temperature sufficient to reflow the solder on said telescoped members; and simultaneously

applying sufficient pressure radially with the heated crimping means to initially crimp and reduce said radial clearance to a minimum thickness adjacent the open end of the second tube; and continuing to apply radial pressure



in a manner that progressively reduces said radial clearance in an axial direction toward the open end of the first tube while providing melted solder between the surfaces to be joined as said crimping proceeds to hydraulically force the solder out of the radial clearance with sufficient energy to cause the solder to scrub oxide from the surfaces to be joined and effect a joint therebetween.

4,002,286

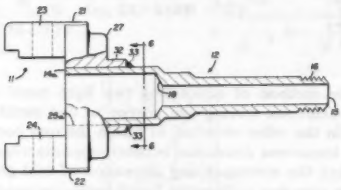
METHOD OF MANUFACTURING A STEERING KNUCKLE AND SPINDLE

Joseph A. Simon, 17755 Masonic Blvd., Fraser, Mich. 48026

Filed Nov. 3, 1975, Ser. No. 628,356

Int. Cl.² B23K *31/00*

U.S. Cl. 228—174 **10 Claims**



1. An improved method for manufacturing an integral steering knuckle and spindle unit for a vehicle such as a truck comprising:

cold forming a hollow elongated metal spindle portion having first and second ends;

forging a knuckle portion having a base and two spaced apart bosses on opposite ends of said base;

machining an aligned bore in each boss to receive a king pin;

machining a bore through the base of said knuckle portion to be aligned with the hollow portion of said spindle; and

welding said knuckle portion base and spindle portion first end together to form an integral unit with the bore of said knuckle base aligned with the hollow portion of said spindle.

4,002,287

RELATIVELY FLAT BLANK FOR A CONTAINER AND THE CONTAINER MADE THEREFROM

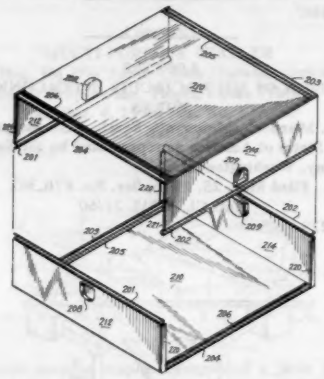
Saul Saveth, 132-29 33rd Ave., Flushing, N.Y. 11354

Continuation-in-part of Ser. No. 526,371, Nov. 22, 1974, Pat. No. 3,924,798. This application Dec. 5, 1975, Ser. No. 638,058

Int. Cl.² B65D *11/10, 11/22*

U.S. Cl. 229—23 AB **13 Claims**

1. A collapsible container comprising first and second sections each including hingeably connected, generally quadrilateral central and wing sectors with the wing sectors being connected on opposite sides of the central sector so that each central sector has two opposite free edge sides and two further sides connected to the associated wing sectors, the sectors of the first section corresponding at least substantially in size and shape to the sectors of the second section, the sections each being foldable into a U-shape and being interengageable in cross-wise relation with each other to form a parallelpiped structure enclosing a chamber, each wing sector having a side



connected to the associated central sector and a free opposite parallel side with a free end, each wing sector further having two free lateral sides extending between the first two said sides thereof, and hook-shaped portions on said free ends of the wing sectors and on the free edge sides of the central sectors, the hook-shaped portions on the wing sectors being engaged with the hook-shaped portions of the central sectors to lock the sectors together, each central sector being provided with grooves extending along and adjacent the hook portions thereof for preventing inward movement of the free ends of the wing sectors of the other section.

4,002,288

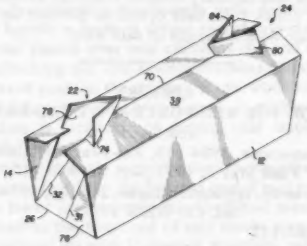
FOOD CONTAINER

Carle D. Klupt, 8218 Arrowhead Road, Baltimore, Md. 21208

Filed Apr. 21, 1976, Ser. No. 678,783

Int. Cl.² B65D *5/10*

U.S. Cl. 229—39 R **13 Claims**



1. A one-piece blank for a container comprising:

a quadrilateral bottom panel,

first and second quadrilateral side panels hingedly connected along longitudinal fold lines to said bottom panel,

a top panel hingedly connected along a longitudinal fold line to said first side panel,

a pair of quadrilateral end panels hingedly connected along lateral fold lines to said bottom panel,

each of said end panels include a pair of fold lines dividing the end panel into three triangles, and

a pair of means, defining an opening beginning on opposite lateral edges of said top panel, for removably receiving and locking said pair of end panels respectively.

4,002,289

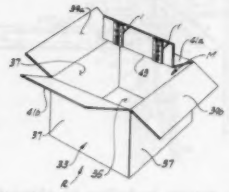
STATIC-TYPE MIXER AND RECEPTACLE

Thomas B. Moore, 32 Progress Parkway, Maryland Heights, Mo. 63043

Division of Ser. No. 473,415, May 28, 1974, Pat. No. 3,927,868. This application July 15, 1975, Ser. No. 596,171

Int. Cl.² B65D *5/66*

U.S. Cl. 229—44 R **1 Claim**



1. A receptacle for receiving an item to be packaged and for having plastic foamed in place around the item for protecting the item from damage durin shipping, said receptacle having a mouth for placement of the item in the receptacle and for introduction of plastic, and one or more disposable static-type mixers secured to said receptacle adjacent its mouth, said receptacle comprising a carton having at least one closure flap for closing the mouth of the carton, said one or more static-type mixers being secured to said flap for discharge of plastic foam material therefrom and for introduction of said foam material into the carton, said one flap being hingedly folded along a line parallel to the outer edge of the flap intermediate said outer edge and the attachment of the flap to the box so that the outer end portion of the flap may be hingedly bent to extend generally upwardly when said one flap is folded closed, said mixer being secured to the inner surface of the outer end portion of said one flap such that with said one flap folded closed and with said outer end portion thereof extending generally vertically, said mixer is disposed for ready introduction of said plastic foam material into the box.

4,002,290

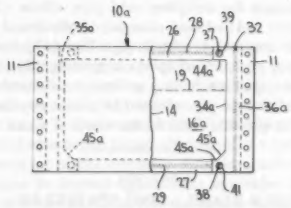
ENVELOPE ASSEMBLY

Edmund G. Van Malderghem, Lewiston, N.Y., assignor to Moore Business Forms, Inc., Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 495,924, Aug. 8, 1974, Pat. No. 3,941,307. This application Jan. 12, 1976, Ser. No. 648,059

Int. Cl.² B65D *27/10*

U.S. Cl. 229—69 **7 Claims**



1. A continuous envelope assembly having spaced transverse lines of weakening defining a succession of interconnected sealed envelopes, comprising: front and back panels, and insert material within each sealed envelope, said insert material at least comprising interconnected upper and lower panels forming a return envelope, one of said return envelope panels being separable along a keen line of weakening provided therealong, the other of said return envelope panels having a flap foldable over and securable to said one panel for closing said return envelope, said panels of said return envelope being so constructed that all marginal edges thereof are free from attachment to said front and back panels; a portion of said one panel which is separable along the line of weakening being superimposed over said flap and being connected to one of said front and back panels by attaching means; registration means including chip elements in abutting engagement with and unattached to said marginal edges for immobilizing said insert material relative to said front and back panels, said chip elements being adhesively secured to said front and back panels; and a tear strip on each said sealed envelope for opening said sealed envelope, said portion of said one panel being retained with said sealed envelope upon the removal of said return envelope from said sealed envelope.

4,002,291

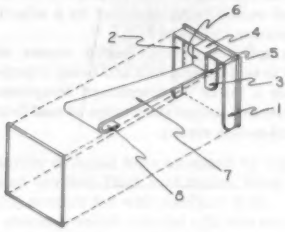
NEWSPAPER DELIVERY TUBE INSERT

Joel W. Hodge, 208 Riverview Court, Elizabethton, Tenn. 37643

Filed June 29, 1976, Ser. No. 700,917

Int. Cl.² B65D *91/00*

U.S. Cl. 232—17 **4 Claims**



1. A readily insertable newspaper support bracket device for insertion into a newspaper delivery tube of one piece, elongated, hollow body construction open at one end and closed at the other; which support device comprises three descending legs connected at a common point, two of which are opposing legs which substantially follow the contours of the interior of the tube terminating at the lower inside edges of the rear end of the tube when the device has been inserted in the tube, and the third leg flat against the closed end of the tube when inserted; and a spring clip attached at the hereinbefore defined common point, which spring clip descends to about the mid-point of the tube then forms a wide ascending arch nearly to the top of the tube terminating in the front one-half of the tube in a reverse bend to act as a finger hold.

4,002,292

TIMING DEVICE FOR THERMOSTATIC-CONTROL UNITS

James G. Parks, 2463 Riverside Place, Los Angeles, Calif. 90039

Filed Aug. 25, 1975, Ser. No. 607,441

Int. Cl.² F23N *5/20;* **H01H** *37/02*

U.S. Cl. 236—46 R **5 Claims**

1. A timing device for thermostatic- controlled heating units wherein the combination thereof comprises:

a clock mechanism having an output shaft projecting therefrom;

a threaded, support bushing removably mounted to said output shaft and having a flat-keyed portion formed thereon;

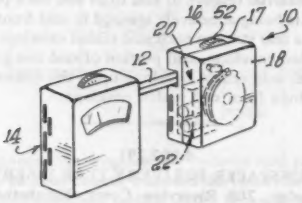
a plurality of cam plates arranged to be selectively positioned on said bushing, said plates having at least one

radially-projecting, cam head integrally formed thereon and a central opening disposed therein;

a timing plate positioned to be superposed over said cam plates whereby said cam plates are selectively positioned relative to said timing plate, wherein said timing plate includes a central aperture having a keyed, flat side to correspond to said keyed portion of said bushing, whereby rotation on said bushing is prevented thereby;

means for securing said plates to said bushing;

a timing-switch means arranged to be activated by said cam heads at predetermined intervals;



power means removably connected to said clock mechanism for the operation thereof;

a first temperature-control-switch means electrically connected to said timing-switch means, said first temperature-control switch being operated by a selective, ambient, temperature range; and

a second temperature-control-switch means electrically connected to said heating unit and being selectively operative within a lower predetermined temperature range than the selective temperature range of said first temperature-control-switch means.

4,002,293

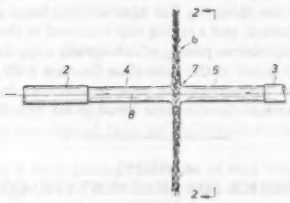
METHOD AND APPARATUS FOR SHAPING AND POSITIONING FLUID DISPERSAL PATTERNS

Thomas R. Simmons, 3510 Lobit, Dickinson, Tex. 77027

Continuation-in-part of Ser. No. 349,252, April 9, 1973, abandoned. This application Mar. 13, 1974, Ser. No. 450,549

Int. Cl.² B05B *1/26*

U.S. Cl. 239—11 **18 Claims**



12. A method of establishing and positioning a free traveling circular and substantially non-aerated dispersal of liquid, comprising

forming and aiming a first substantially cylindrical jet of substantially non-aerated liquid in one direction along a first preselected axis,

forming and aiming a second substantially cylindrical jet of substantially non-aerated liquid in the opposite direction along a second preselected axis parallel with said first axis to collide with said first jet and produce said dispersal, and

discharging said jets at velocities to position said dispersal at a preselected location along said axes.

4,002,294

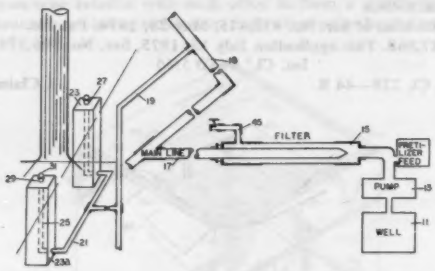
GROVE IRRIGATION SYSTEM

Elbert (Bert) Alvin McLeod, P.O. Box 447, Frostproof, Fla. 33843

Filed June 25, 1975, Ser. No. 590,025

Int. Cl.² B05B *15/02, 15/06*

U.S. Cl. 239—104 **1 Claim**



1. An irrigation system including an elongated filter (15) comprising:

a. an elongated cylindrical outer casing (33) having input and output ports (37,44) at the longitudinal ends thereof;

b. an elongated cylindrical inner treating unit (35) longitudinally disposed in said outer casing, one end of said inner treating unit associated with said output port, the other end of said inner treating unit having an end wall with samll filter apertures (41) on said inner treating unit extending from said end wall along a substantial length of said inner treating unit but less than the entire length of the inner treating unit, so that said filter apertures prevent undesirable particles from entering said inner treating unit, an outer chamber defined by said outer casing and said treating unit wherein said outer chamber is adapted to receive fluid from said input port (37) into said outer chamber;

c. spigot valve means attached to said outer casing along the circumference of said outer casing near the longitudinal end associated with the output port and furthest from said filter apertures, for controlling fluid flow from said outer chamber through said filter apertures into said inner treating unit, and into said output port when said valve means is in its closed position, and for controlling fluid flow from said outer chamber through said spigot and valve means, when said valve means is in its open position, so as to flush out undesirable particles from the outer chamber;

d. an elongated rectangular concrete block post (23), a longitudinal post pipe (25) in said post, said post pipe extending outwardly of said block post, a spray head (31) spanning an arc between 45° to 180 ° attached to the outwardly extending end of said post pipe, a pipe elbow (26) connected to the other end of said post pipe; and,

e. piping means for coupling said pipe elbow (26) to the output port (44) of said elongated cylindrical outer casing which comprises, a main pipe line (17) connected to said output port, a T-shaped connection (21) coupled to said main pipe line having at least one connection pipe connected to said pipe elbow (26), whereby the system is adapted to provide fluid to the roots of trees.

4,002,295

SELF-REGULATING SPRINKLER

Mordeki Drori, 89 Zahal St., Kiron, Israel

Filed Feb. 17, 1976, Ser. No. 658,608

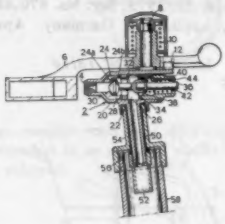
Claims priority, application Israel, Feb. 19, 1975, 46669

Int. Cl.² B05B *3/02*

U.S. Cl. 239—230 **7 Claims**

1. A pressure-regulated water sprinkler including a sprin-

kler head carrying a nozzle at one end through which the water discharges in the form of a jet, characterized in that the sprinkler head includes a housing defining an internal chamber communicating at one end with the nozzle and having an inlet at another end; the nozzle end of the housing being formed with a plurality of internal ribs spaced circumferentially and extending longitudinally to a point within the chamber intermediate the nozzle and inlet ends; said ribs being formed with a first annular shoulder adjacent to the nozzle end of the chamber, and with a second annular shoulder more



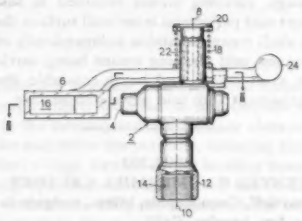
remote from the nozzle end and of larger diameter than the first annular shoulder; an annular ring fixedly disposed within the chamber and having one side bearing against said second annular shoulder and its opposite side facing the housing inlet; a regulator member movably disposed within the chamber between said ring and first annular shoulder; and pressure-sensing means for sensing the inlet pressure and automatically moving the regulator member towards and away from said one side of the annular ring to regulate the flow therethrough to the nozzle.

4,002,296

ROTARY SPRINKLER PARTICULARLY FOR USE WITH LOW-ENERGY WATER JETS

Mordeki Drori, 89 Zahal St., Kiron, Israel

Filed Feb. 17, 1976, Ser. No. 658,610
Claims priority, application Israel, Feb. 19, 1975, 46668
Int. Cl.² B05B 3/02
U.S. Cl. 239—230 **4 Claims**



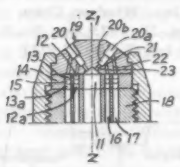
1. A rotary sprinkler particularly for use with low energy water jets, comprising: a sprinkler head, a mounting for the sprinkler head for mounting same on a pipe to rotate about a vertical axis, a nozzle carried by the sprinkler head through which the water is discharged in the form of a jet, and a pivotably mounted arm urged in one direction by a spring and driven by the water jet in the opposite direction, causing the arm to oscillate and to impact against the sprinkler head to rotate same about a vertical axis; characterized in that the sprinkler includes a pair of stops limiting all the oscillations of the arm; one of said stops being located to fix the normal position of the arm, as urged by said spring, in alignment with the water jet so as to be impinged and to be driven thereby; the other of said stops being located to permit the oscillating arm to be driven through a forward stroke, against the force of the spring, for a short distance to apply an impact against the sprinkler head and to rotate same about its vertical axis, said other stop being continuously located to permit the oscillating arm to pivot during said forward stroke only through a short arc of less than 20° before impacting against the sprinkler head, which short arc is sufficient to remove the oscillating arm from the path of the water jet, but not sufficient to load the spring with enough energy to cause the arm to rotate the sprinkler head during the return stroke of the arm by the spring.

4,002,297

BURNERS OF LIQUID FUELS ATOMIZED BY THE EXPANSION OF A COMPRESSED AUXILIARY FLUID

Jean-Claude L. Pillard, Marseille, France, assignor to Entreprise Generale de Chauffage Industriel Pillard, Marseille, France

Filed Oct. 9, 1975, Ser. No. 621,153
Claims priority, application France, Oct. 24, 1974, 74.41031
Int. Cl.² B05B 7/04, 7/08
U.S. Cl. 239—429 **7 Claims**



1. A burner of liquid fuels atomized by the expansion of a compressed auxiliary fluid, said burner being composed of:

a central conduit fed with auxiliary fluid,

a first annular conduit, coaxial with said central conduit, fed with a liquid fuel,

a multi-nozzle head comprising nozzles which open out into a combustion chamber and which are disposed along a frustum of a cone diverging towards said chamber, each of these nozzles comprising a mixing chamber into which opens a channel injecting auxiliary fluid communicating with said central conduit and at least one channel injecting liquid fuel communicating with said first annular conduit, which burner comprises, in addition, supplementary annular conduits, coaxial with said central conduit, each of these supplementary conduits being fed with an auxiliary liquid and being connected by at least one channel to each of the mixing chambers, so that each nozzle injects into the flame an atomized mixture of said liquid fuel and of at least one auxiliary liquid.

4,002,298

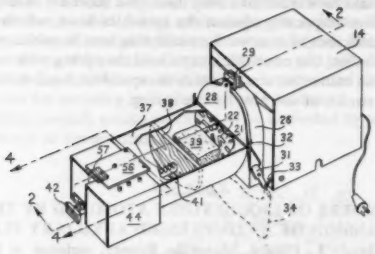
CHEESE GRATING MACHINE

Salvatore C. Latora, 3159 Baker St., San Francisco, Calif. 94123

Filed Oct. 16, 1975, Ser. No. 622,860
Int. Cl.² B02C 18/14, 18/22
U.S. Cl. 241—36 **8 Claims**

1. A cheese grating machine comprising a disk formed with grating teeth on its surface, means for rotating said disk, an enclosure around the periphery of said disk having a grated cheese dispensing aperture, a trough parallel to the axis of rotation of said disk, a pusher reciprocable in said trough to push a block of cheese in said trough into contact with said disk, pusher advancing means to push said pusher toward said disk, a cover for said trough, hinge means for said cover and means for securing said cover in closed position and safety

means to interrupt operation of said means for rotating said disk and said pusher advancing means, said safety means being



responsive to said cover being open or to said pusher being in close proximity to said disk.

4,002,299

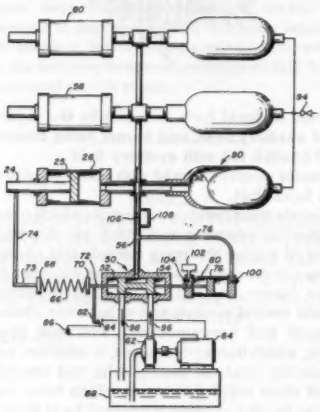
HYDRAULICALLY LOADED PULVERIZER JOURNAL

Clemens John Skalka, Simsbury, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Sept. 29, 1975, Ser. No. 617,357

Int. Cl.² B02C *4/32*

U.S. Cl. 241—37 **5 Claims**



1. In a pulverizing mill, an upright grinding bowl, means for rotating the bowl, a grinding roll cooperating with the upper surface of the bowl to perform the pulverizing therebetween, fluid loading means forcing the roll toward the bowl, control means for controlling the pressure of the fluid contained in the fluid loading means, said control means including a pump, a reservoir for supplying fluid to the pump, a first pipe extending from the pump to the loading means, a servo valve located in the first pipe, a second pipe extending between the servo valve and the reservoir, the servo valve having three positions, a first position in which fluid can pass from the pump to the loading means, a second position in which fluid can pass from the loading means to the reservoir, and a third position in which no fluid flow takes place, a mechanical spring, a piston and cylinder arrangement which is subjected to the pressure contained in the fluid loading means, a first spring seat on one end of the spring which is interconnected to the roll in such a manner that it moves with the roll, a second spring seat on the other end of the spring which is connected to the piston and cylinder arrangement and moves therewith, the spring, piston and cylinder arrangement all being related to the servo valve such that when the roll is in a steady state the servo valve is in its third position, if the roll moves towards the upper surface of the bowl, the servo valve is moved to its second position, and if the roll moves away from the upper surface of the bowl the servo valve is moved to its first position.

4,002,300

CHIP-FORMING APPARATUS

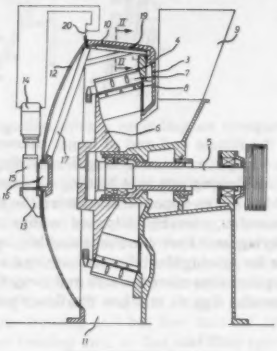
Hans-Joachim Mruck, Bielefeld, and Gerhard Maier, Brackwede, both of Germany, assignors to Maschinenfabrik B. Maier KG, Brackwede, Germany

Filed Apr. 22, 1975, Ser. No. 570,482

Claims priority, application Germany, Apr. 26, 1974, 2420189

Int. Cl.² B02C *18/14*

U.S. Cl. 241—37.5 **6 Claims**



1. Chip-forming apparatus comprising housing means having a peripheral inner wall surface, a cutter cage mounted within said housing means and spaced from said peripheral inner wall surface, said cutter cage having a plurality of chip-cutting blades, means for feeding coarse material to said cutter cage to be formed into chips by said chip-cutting blades and hurled radially outwardly against said peripheral inner wall surface, rotatable first drive shaft means disposed in said housing means and connected with a rotor having cleavage knives at its periphery, said cleavage knives cooperating with said cutter cage, cleaning means mounted in said housing means adjacent said peripheral inner wall surface thereof, and second drive shaft means rotatable independently of said first drive shaft means, said cleaning means being carried by said second drive shaft means and being rotatable therewith in brushing engagement with said inner wall surface.

4,002,301

VENTED HAMMERMILL CRUSHER

George S. Shurtleff, Coon Rapids, Minn., assignor to Baker Oil Tools, Inc., Los Angeles, Calif.

Filed Nov. 6, 1975, Ser. No. 629,286

Int. Cl.² B02C *23/34*

U.S. Cl. 241—48 **7 Claims**

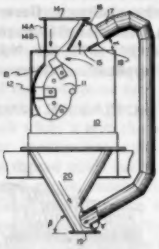
1. A vented hammermill crusher comprising:

a. a housing and rotary crusher means having an upper inlet opening above that portion of the rotary crusher means where the crusher direction is downward, a vent opening above that portion of the rotary crusher means where the crusher direction is upwards,

b. a crusher particulate collector having a large upper opening communicating with the housing bottom, said collector having sloping sides and a small discharge opening,

c. a discharge conduit communicating with the discharge opening of the collector, said conduit having substantially the same angle as the collector wall relative to the horizontal and having an opening therein,

d. a vent duct external to said housing connecting said vent opening of the crusher housing and the opening in the



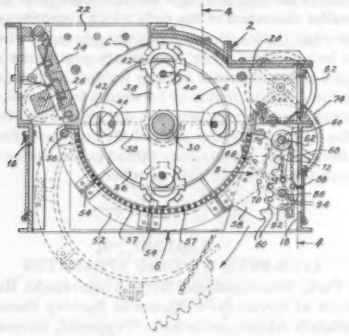
discharge conduit, said vent duct connecting to said discharge conduit at an angle of about 90° to the discharge conduit sidewall.

4,002,302

REDUCING MACHINE HAVING A POSITIVELY DISPLACED GRATE

Donald G. Miller, Glendale, Mo., assignor to American Pulverizer Company, St. Louis, Mo.

Filed Jan. 21, 1976, Ser. No. 651,120
Int. Cl.² B02C *13/284*
U.S. Cl. 241—89 **9 Claims**



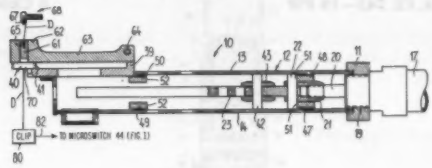
1. A reducing machine comprising: a housing having an inlet through which material is introduced; a rotor which revolves in the housing and has breaker elements which pass by the inlet and strike the material, reducing the material to a smaller size; a cage located in the housing beneath the rotor and having apertures through which the reduced material passes; a chain suspending the cage from the housing so as to retain the cage in the proper position beneath the rotor; a sprocket rotatable in the housing and having the chain passed over it such that when the sprocket is rotated in one direction the chain will pay off of the sprocket and the cage will be permitted to descend and when rotated in the opposite direction the chain will be drawn over the sprocket and the cage will be elevated; and means for exerting a downwardly directed force on the cage so as to urge the cage downwardly in the event that it fails to descend under its own weight when the chain is released, the means for exerting a downwardly directed force on the cage comprising a gear segment on the cage and a gear in the housing and meshed with the gear segment, the sprocket and gear rotating in unison such that the rotation of the gear is synchronized with the movement of the chain, the chain being of sufficient length to enable the cage to drop downwardly past the point at which the gear is engaged with the gear segment.

4,002,303

DEVICE FOR SECURING THE WINDING ENDS OF ELECTRICAL COILS ON TERMINAL PINS

Hans Schmid, Ruschlikon, Switzerland, assignor to A. Christiens Societe Anonyme, Brussels, Belgium

Filed Apr. 16, 1975, Ser. No. 568,657
Claims priority, application Switzerland, Apr. 23, 1974, 5530/74
Int. Cl.² H01F *41/10*
U.S. Cl. 242—7.17 **17 Claims**



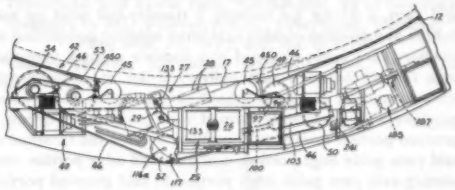
16. Device for securing the wire at the end of an electrical coil on a terminal pin of a coil body comprising:
bearing means,
a coiling member rotatably mounted in said bearing means,
drive means for rotating said coiling member,
an axial recess in one end of said coiling member and extending along the axis of rotation thereof for accommodating a terminal pin,
a longitudinal slot in said bearing means, and
a groove extending axially all the way through said coiling member and arranged differentially eccentrically throughout at least most of its length with respect to said axis of rotation for accommodating said wire,
said groove being alignable on rotation of said coiling member with said longitudinal slot to allow said wire to pass through said slot into said groove.

4,002,304

METHOD AND APPARATUS FOR STRESSING A TENDON AND BANDING A STRUCTURE

Endre F. Peszeszer, San Diego, Calif., assignor to General Atomic Company, San Diego, Calif.

Filed June 6, 1975, Ser. No. 584,337
Int. Cl.² B21F *17/00*
U.S. Cl. 242—7.21 **17 Claims**



1. A wire winding apparatus for banding a wall of a structure with a tensioned tendon comprising:
a carriage movable about the structural wall to apply a tensioned tendon to the structural wall,
means on said carriage for tensioning the tendon and for paying out the tendon to the structural wall,
belt means encircling said structural wall and in frictional engagment with a substantial peripheral portion of said structural wall,
means on said carriage for engaging said belt means and pulling thereon with sufficient force to propel said carriage circumferentially about said wall, and
said belt means comprising an upper belt extending about an upper portion of said carriage and a lower belt extending about a lower portion of said carriage, said belts being spaced vertically from each other and extending circumferentially about said structure.

4,002,305

DEVICE FOR FORMING A TAIL WIND AROUND A BOBBIN HELD BY A TAKE-UP MECHANISM OF A RINGLESS SPINNING MACHINE

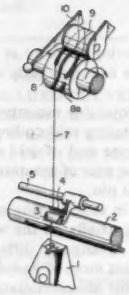
Tatsuo Takeuchi; Kozo Motobayashi, both of Aichi, and Kazuo Kamiya, Nishio, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi and Daiwa Boseki Kabushiki Kaisha, Osaka, both of, Japan

Filed June 25, 1975, Ser. No. 590,042

Claims priority, application Japan, June 26, 1974, 49-75573

Int. Cl.² B65H *54/34;* D01H *1/12*

U.S. Cl. 242—18 PW 6 Claims



1. In a production unit of a ringless spinning machine provided with means for delivering a yarn from a spinning unit and a take-up mechanism for making a yarn package on a bobbin turnably held by said take-up mechanism, said take-up mechanism being provided with a traverse motion mechanism for forming said yarn package in cross winding by traversing said yarn, a device for forming a transfer-tail wind on said bobbin at a position outside said cross winding comprising an auxiliary yarn guide disposed at a position along a yarn passage formed between said delivery roller means and said traverse motion mechanism, said auxiliary yarn guide being provided with a smoothly formed yarn guide edge portion, a grooved portion formed at a position outside the terminal of said yarn guide edge portion, and a curved edge portion connecting said yarn guide edge portion to said grooved portion extending into the yarn guide edge portion traversed by said yarn during said traverse motion, said yarn guide edge portion positoned at a particular position wherein it is capable of engaging with said traversing yarn and said grooved portion being capable of taking a position outside the stroke of said traverse motion of said yarn along said yarn guide edge portion when said yarn is reciprocally traversed along said yarn guide edge portion, whereby when said yarn is urged to said yarn guide edge portion during said traverse motion thereof, said yarn is guided by said curved edge portion and displaced automatically to said grooved portion so that said yarn is forced to leave said traverse mechanism and stop the motion caused thereby, and is directed to an end portion outside the normal winding portion of said bobbin, and when said yarn is manually moved from said grooved portion of said auxiliary yarn guide, said yarn is caught by and resumes the motion caused by said traverse mechanism.

4,002,306

METHOD AND APPARATUS FOR WINDING CONICAL CROSS-WOUND COILS OR BOBBINS WITH CONSTANT THREAD-FEEDING VELOCITY

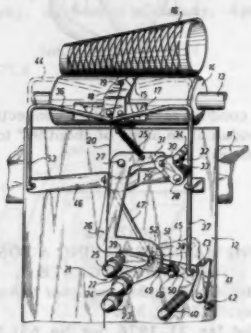
Hans Raasch, Monchengladbach, Germany, assignor to W. Schlafhorst & Co., Monchen-Gladbach, Germany

Filed Nov. 20, 1975, Ser. No. 633,706

Claims priority, application Germany, Nov. 20, 1974, 2454916

Int. Cl.² B65H *54/02*

U.S. Cl. 242—18 R 7 Claims



1. Method of winding conical cross-wound coils at constant thread feed velocity wherein compensation is provided by a storage device for the varying winding speeds from the larger to the smaller diameters of the coils which comprises setting a thread storage device in zero position thereof, wherein no thread is being stored, after alternative occurrence of a coil change and a thread break; initially holding with an auxiliary thread guide a thread that is to be wound into a coil; advancing a thread guiding member in a direction from the larger toward the smaller diameter ends of the coil and, after releasing the thread from the auxiliary thread guide, taking over the thread with the thread guiding member.

4,002,307

LOSS-FREE WINDING APPARATUS

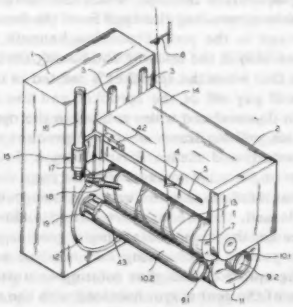
Herbert Turk, Remscheid, and Herbert Schiminski, Huckeswagen, both of Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Filed Dec. 18, 1975, Ser. No. 642,187

Claims priority, application Germany, Dec. 23, 1974, 2461223

Int. Cl.² B65H *54/06, 67/04*

U.S. Cl. 242—18 A 10 Claims



1. A thread changeover combination for shifting thread

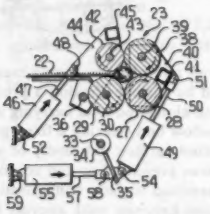
from a thread winding package to an empty winding tube without loss of thread comprising a bobbin revolver adapted to rotate and stop in predetermined positions, at least two rotatable chucks mounted on said revolver and adapted to orbit as said revolver rotates between at least a thread winding position and a winding package removal position, each chuck being adapted to releasably hold a winding bobbin or tube thereon, means for traversing the thread in a traverse plane across the winding of the bobbin or tube on the chuck which is in the winding position, means for rotatably driving each winding on each chuck while it is in the winding position, and a thread changeover mechanism embodying an auxiliary thread guide having a thread guide surface at an obtuse angle relative to said traverse plane, means for moving a thread-engaging portion of said guide surface into and out of said traverse plane adjacent one end of the traverse stroke of the thread, said thread guide further having a thread trap at the end of said guide surface which is remote from said thread-engaging surface, said thread trap lying outside said traverse plane, said thread trap being adapted to receive and hold therein thread which is running to the winding package when said thread runs along said guide surface after its thread-engaging portion has moved into said traverse plane and the thread moves along said guide surface to said thread trap, and means for shifting said thread guide with the thread running through said thread trap to a position wherein the running thread can be caught by another of said chucks or the winding tube or bobbin thereon.

4,002,308

CARPET ROLL-UP MECHANISM

James M. Feighery, Dalton, Ga., assignor to Tex Del Inc., Dalton, Ga.

Filed Aug. 5, 1975, Ser. No. 601,980
Int. Cl.² B65H *17/12, 19/26*
U.S. Cl. 242—66 **5 Claims**



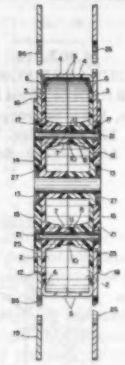
1. A carpet roll-up mechanism comprising a support frame, a pair of fixed axis parallel rolls journaled on the support frame in side-by-side close relationship, a pair of swing axis rolls which are parallel to each other and parallel to the fixed axis rolls and bodily movable on arcuate paths relative to the fixed axis rolls, end carrier frames for the swing axis rolls including interconnecting beams, the swing axis rolls being journaled on said end carrier frames, the end carrier frames for one swing axis roll rockably mounted on the shaft of one fixed axis roll, fixed axis shaft means on said support frame spaced from and parallel to the other fixed axis roll and rockably supporting the end carrier frames of the other swing axis roll, reversible power drive means coupled with all of said rolls for turning them in unison in one direction on their parallel axes, first extensible and retractable power cylinder means interconnecting said support frame and end carrier frames for the last-named swing axis roll, second extensible and retractable power cylinder means connected with the end carrier frames of the first-named swing axis roll, intermediate fixed axis rockable support means on the support frame and connected with said second power cylinder means and supporting one end thereof, and third extensible and retractable power cylinder means interconnecting said support frame and intermediate fixed axis rockable support means.

4,002,309

BOBBIN FOR CINEMATOGRAPHIC FILMS

Alejandro Ruiz-Barbotteau, Escobedo Sur 733, Ste. 201, Monterrey, Neuvo Leon, Mexico

Filed July 10, 1975, Ser. No. 594,730
Int. Cl.² B65H *75/18*
U.S. Cl. 242—71.8 **3 Claims**



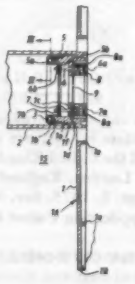
1. Improved bobbin structure for films comprising in combination, a pair of film retaining panels defining a central circular aperture, a rotatable center hub of "Nylon" comprised of a plurality of interfitting pieces held in registration to define crevices on opposite sides thereof with two spaced walls held a fixed distance apart greater than the thickness of said panels for receiving thereinto loosely the circular aperture of said panels to rotate on the hub.

4,002,310

REEL FOR PHOTOGRAPHING PAPER OR THE LIKE

Friedrich Ganser, Feldkirchen; Thomas Hammer, Munich; Hans Dieter Frick, Taufkirchen; Wolfgang Viehrig, Munich; Karl Heinz Ritter, Karlsfeld; Wolfgang Kwiatkowski, Unterhaching; Viktor Osegowitsch, Taufkirchen; Josef Glass, Ottobrunn, and Erwin Laar, Taufkirchen, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Sept. 22, 1975, Ser. No. 615,792
Claims priority, application Germany, Sept. 26, 1974, 7432380[U]
Int. Cl.² B65H *75/18*
U.S. Cl. 242—71.8 **11 Claims**



1. In a reel for collection or paying out of flexible web material, particularly photographic paper, a combination comprising a core having two end portions and a cylindrical external surface; and at least one substantially disk-shaped

flange connected with and adjacent to one end portion of said core, said flange having a periphery, a short cylindrical portion having an outer surface of the same diameter as said external surface of said core and merging with the same, and a conical surface extending between said cylindrical portion of said flange and said periphery and tapering outwardly in a direction away from said one end portion.

4,002,311

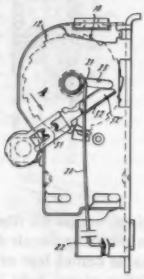
BELT TENSION ELIMINATOR FOR SEAT BELT SYSTEM

Robert C. Fisher, 4210 N. Dixie, West Palm Beach, Fla. 33407, and Cecil A. Collins, 1355 Edgeorge, Pontiac, Mich. 48054

Filed Jan. 12, 1976, Ser. No. 648,400

Int. Cl.² A62B *35/00*; B65H *75/48*

U.S. Cl. 242—107.7 **8 Claims**



1. A safety belt retractor comprising a frame and a spool mounted on said frame, means resiliently biassing said spool in a belt retraction direction, said spool having an end flange combined with improved means for controlling protraction and retraction of the belt, said means including a disc attached to said end flange for rotation therewith, said disc having a first annular track adapted to receive a stop-follower resiliently urged into said track, a second annular track disposed outwardly of said first track and in communication therewith to receive said stopfollower upon initial retraction of a withdrawn belt and to permit continuous retraction of the belt when the belt is unlatched by the user, and a third control track which communicates with the second track to receive said stop-follower upon further limited protraction of the belt, a stop in said control track engageable by said stop-follower when said limited protraction is released to prevent further retraction of the belt until released by the user.

4,002,312

TRUNCATED AEROFOILS HAVING SPANWISE SPLITTERS

Edward Granville Broadbent, Farnham, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

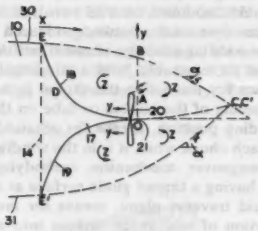
Filed Sept. 5, 1975, Ser. No. 610,849

Claims priority, application United Kingdom, Sept. 6, 1974, 39127/74

Int. Cl.² B64C *23/00*

U.S. Cl. 244—40 R **4 Claims**

1. An aerofoil comprising: an upper surface and a lower surface and having on each surface, aft of the point of maximum thickness of the aerofoil, a discontinuity; a spanwise splitter extending downstream of said discontinuities to a trailing edge, there being between each of said discontinuities and said trailing edge a concavely contoured surface; and a plurality of fans mounted on said trailing edge and arranged to



blow air over said concave surfaces in the upstream direction relative to free stream airflow over the aerofoil.

4,002,313

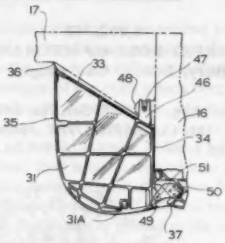
AIRCRAFT CONFORMAL LOAD CARRYING PALLET

Walter G. Blank, Sr., Florissant; Frank Laacke, Des Peres; Jacob W. Priser, St. Charles, and Robert W. White, Florissant, all of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed July 28, 1975, Ser. No. 599,823

Int. Cl.² B64D *9/00*

U.S. Cl. 244—118 R **6 Claims**



1. In an aircraft a fuselage and wing meeting at a wing root area constituted by surfaces having a predetermined surface configuration; an elongated load carrying and enclosing pallet comprising a hollow body having a fixed geometry presenting an exposed wetted surface outwardly of said wing root area and other surfaces presented to and conforming substantially to said predetermined surface configuration of said fuselage and wing; means between said aircraft fuselage and other surfaces and spaced along the length of said hollow body and securely connecting said hollow body to the aircraft; and means carried by said hollow body in position engaging and forming a seal between the margins of said wetted surfaces and said fuselage and wing root area having said predetermined surface configuration.

4,002,314

TRAIN VEHICLE SPEED CONTROL SIGNAL PROVIDING APPARATUS

Isaac R. Barpal, McMurray, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 7, 1975, Ser. No. 593,816

Int. Cl.² B61L *3/20*

U.S. Cl. 246—63 C **10 Claims**

1. In a train vehicle control apparatus for determining the operation of a train vehicle along a track including a plurality of signal blocks, the combination of:

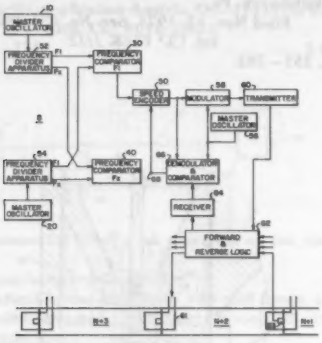
means for providing a first frequency signal having one predetermined frequency for controlling the operation of said train vehicle,

means responsive to said first frequency signal for providing a first output signal,

means for providing a second frequency signal having a

different predetermined frequency for controlling the operation of said train vehicle,

means responsive to said second frequency signal for providing a second output signal, and



means for comparing the respective frequencies of said first output signal and said second output signal for providing a control signal for controlling the operation of said train vehicle when the respective frequencies of said first output signal and said second output signal are substantially the same.

4,002,315

VIBRATION DAMPER

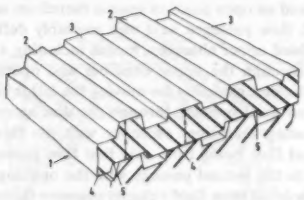
Willy Van Goubergen, Kraainem-Brussel, Belgium, assignor to N.V. Imexin S.A., Brussels, Belgium

Filed May 14, 1975, Ser. No. 577,472

Claims priority, application Germany, May 21, 1974, 7417627[U]

Int. Cl.[2] F16F *16/00*

U.S. Cl. 248—24 3 Claims



1. A vibration damper formed of a shelf-damping material, such as rubber or like elastomer, said damper being provided with upwardly and downwardly extending projections from upper and lower surfaces, respectively, of said damper, said projections having end faces parallel to said surfaces and arranged in groups of different heights, characterized in that said upwardly extending projections are comprised of a group having a specific height with an alternate group of upwardly extending projections of less height, said downwardly-extending projections being disposed on said lower surface about substantially the entire lower plate surface except areas of said lower plate surface opposite said upwardly extending projections of said specific height, the distance between said end faces of said upwardly extending projections of said specific height and said lower surface being substantially equal to the distance between said end faces of said upwardly extending projections of said less height and said downwardly extending projections.

4,002,316

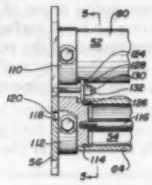
TELESCOPIC SHOCK ABSORBER MOUNT FOR A HYDRAULIC CUSHIONING UNIT IN A RAILWAY CAR TRAILER HITCH

Harvey O. Parchmont, Stafford, Tex., assignor to ACF Industries, Incorporated, New York, N.Y.

Filed May 6, 1975, Ser. No. 574,993

Int. Cl.[2] B60P *7/00*

U.S. Cl. 248—119 S 13 Claims



1. In a collapsible trailer hitch for releasably securing a trailer or the like to the deck of a railroad car for piggyback operation wherein the trailer hitch has a normally vertically disposed and movably mounted leg assembly, a movably mounted normally inclined leg assembly, and a cushioning unit operably connected to the inclined leg assembly, said cushioning unit having a plurality of energy-absorbing telescopic shock absorbers with one end portion of said plurality of shock absorbers being mountable on a connecting end plate, an improvement comprising means to mount said shock absorbers on said end plate which includes:

a. an indention in a side portion of each of said shock absorbers, said indentions being substantially spaced from one end of said shock absorbers, and

b. means to rigidly secure said shock absorbers to said end plate having a bar member being engageable in and extending between said indentions and said bar member being operably connectable to said end plate.

4,002,317

CASTING MOLD ASSEMBLY

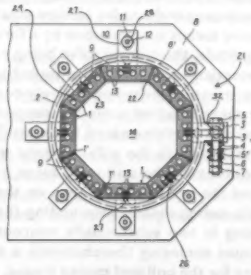
Ernst Fischer, Vienna, Austria, assignor to Gebr. Bohler & Co. AG, Vienna, Austria

Filed Jan. 30, 1975, Ser. No. 545,437

Claims priority, application Germany, Feb. 6, 1974, 2405598

Int. Cl.[2] B22D *27/04;* B41B *11/46*

U.S. Cl. 249—79 6 Claims



1. In a liquid-cooled casting mold assembly, a plurality of elongated plates successively arranged in a closed path about a mold axis to define a mold wall whose internal surfaces define a central mold cavity of regular polygonal cross section, each plate having a planar outer surface and exhibiting at least one bore extending axially therethrough for passage of the cooling liquid, the adjoining surfaces of the successive plates

in the mold wall being disposed in abutting relation, and a securing ring extending around the outer periphery of the mold wall, the ring terminating in a pair of spaced parallel legs extending transverse to the circumference of the ring, a threaded member having a shaft extending through both legs of the ring, spring means positioned on the shaft and having one end disposed in abutting relation with the outer surface of one of the legs of the ring, means carried by the shaft in abutting relation with the other end of the spring means for compressing the legs of the ring toward each other to tightly secure the joints between the successive plates of the mold wall, and a transition member having an inner surface coextensive with and mating with the outer surface of the respective plates and an outer surface which abuts the inner surface of the securing ring and has a curvature that is complementary thereto.

4,002,318

ELECTOMAGNETIC PRESSURE CONTROL VALVE FOR INCOMPRESSIBLE MEDIA

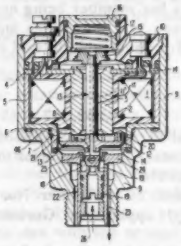
Arwed von Koch, Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed July 15, 1974, Ser. No. 488,443

Claims priority, application Germany, July 20, 1973, 2336927

Int. Cl.² F16K *31/06*

U.S. Cl. 251—129 27 Claims



1. A pressure control valve for an incompressible medium in which the medium is conducted through a valve gap formed by a valve seat means and a valve closure means, and in which the valve closure means is acted upon by a force dependent on a control magnitude, the control valve being constructed as an electrically energized solenoid valve including an energizing coil, a magnet armature means operatively connected with the valve closure means and an armature support means for the armature means, a predetermined force produced by a force storage means acting on the valve closure means in the de-energized condition of the coil, said force being variable by energization of the coil in dependence on the control magnitude, magnetic casing means surrounding the energizing coil and terminating in two substantially concentrically disposed pole shoe means enclosing therebetween a magnet gap, and housing means for the coil and casing means, characterized in that the armature means comprises a ring-shaped provided on the armature support means, said ring-shaped armature is attracted axially into the gap with a more or less large force depending on the coil energization, and in that the armature support means consists of a material whose coefficient of thermal expansion at least approximately corresponds to that of the material of the housing means receiving the coil and magnetic casing means.

4,002,319

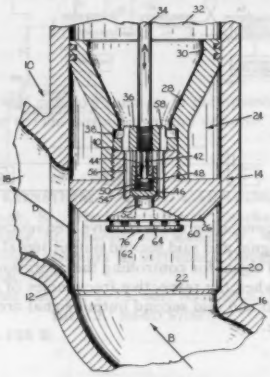
BI-DIRECTIONAL PRESSURE BALANCED VALVE

Eldert B. Pool, Pittsburgh, Pa., and Lalji J. Pavagadhi, Mission Viejo, Calif., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Nov. 12, 1975, Ser. No. 631,286

Int. Cl.² F16K *1/32*

U.S. Cl. 251—282 3 Claims



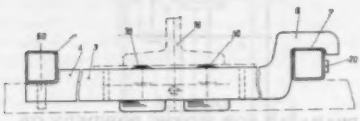
1. In a bi-directional pressure balanced valve of the type which includes a body having a cylindrical valve chamber and first and second flow passages intersecting a lower portion of said cylindrical valve chamber at different axial positions, an annular valve seat between said flow passages and above said second flow passage, a main valve disc assembly slidably supported within said cylindrical valve chamber for axial movement between a closed position sealingly engaging the valve seat and an open position spaced therefrom substantially above both flow passages, said disc assembly defining thereabove a sealed upper chamber, means including a valve stem extending through the upper chamber and operatively connected to the disc assembly for moving the latter between said positions, an axial opening through the disc assembly fluidly communicating the upper chamber with the flow passages, normal fluid flow being from said first flow passage past the valve seat to the second passage with the opening being substantially isolated from fluid velocity pressure thereat whereby only static pressure is communicated to the upper chamber, abnormal fluid flow being from the second flow passage to the first passage with the opening being directly exposed to fluid velocity pressure which is communicated to the upper chamber establishing a pressure differential on the disc and exerting a closing force thereon directed toward the valve set, means to substantially control fluid forces acting on the opposite sides of said main valve disc assembly to facilitate opening and closing of said valve regardless of the direction of fluid flow through said valve; the improvement comprising:

a flow deflecting device carried by the disc assembly below the opening for preventing the opening from being directly exposed to fluid velocity pressure during said abnormal fluid flow from said second flow passage to said first flow passage and thereby reducing the effect of velocity pressure increasing the pressure in the upper chamber and establishing said pressure differential on the disc and exerting said closing force thereon.

4,002,320
RAIL-LIFTING IMPLEMENT

Walter Weber, Sanatoriumstr. 35, Vienna 14, Austria

Filed Oct. 29, 1975, Ser. No. 626,873
Claims priority, application Austria, Oct. 31, 1974, 8797/74
Int. Cl.² E01B 29/22
U.S. Cl. 254—121 5 Claims



1. An implement for lifting a rail which lies on ties, comprising

a frame comprising cross-members,

two longitudinal beams associated with said frame, at least one of said beams being detachably associated with said cross-members,

an arm extending transversely to said beams between the same,

an articulated joint pivotally connecting said arm to said frame,

drive means operable to impart a pivotal movement to said arm about said articulated joint, and

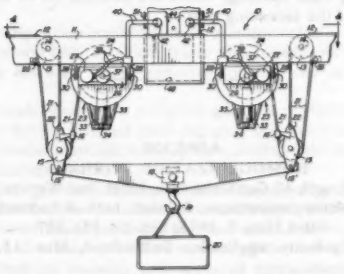
upwardly facing, low-friction bearing means carried by said arm between said beams and spaced from said articulated joint,

said frame being adapted to be pushed under a rail and to assume a condition in which said beams extend along said rail on opposite sides thereof and rest on two spaced apart ties supporting said rail and said bearings engage said rail from underneath between said two ties.

4,002,321
TILTABLE DRUMS FOR WINDING HOIST LINES

John B. Shaw, Phoenix, and Cecil T. Pelts, Glendale, both of Ariz., assignors to Cecil A. Pelts, Phoenix, Ariz.

Filed July 7, 1975, Ser. No. 593,639
Int. Cl.² B66D 1/26
U.S. Cl. 254—184 9 Claims



1. A hoisting device for controlling the deflections of its load carrying line on a pair of power driven rotatable drums comprising:

a frame means having a pair of columns and supporting a cross-beam assembly,

a pair of traveling block means arranged for substantially vertical movement and comprising an equalizer beam means therebetween for supporting a load therefrom,

a pair of line receiving drums rotatably mounted on said frame between said columns for receiving and dispersing load carrying lines,

said pair of traveling block means being positioned between said pair of drums and said equalizer beam means,

a load carrying line for winding on to and off of each of said drums,

one end of each line being secured to an associated drum and the other end threaded around an associated traveling block means, and dead ended on a selected anchoring means,

operator actuated means for tiltably mounting each of said drums,

said means comprising a first pivot means for supporting one end of a drum for pivotal movement of the drum about a given point and tilting means for supporting the other end of the drum,

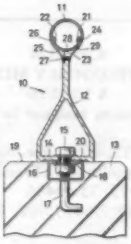
said tilting means causing lateral movement of said other end of said drum a given distance vertically each side of a substantially horizontal position thereof to properly and tightly wind and unwind said line in multiple layers from the drum during load lifting and lowering operations, and

means for selectively rotating each of said drums.

4,002,322
INTERLOCKING HANDRAIL CONSTRUCTION FOR BALUSTRADES

Isamu Matsubara, Nyuzen, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 24, 1975, Ser. No. 616,146
Claims priority, application Japan, Oct. 2, 1974, 49-119582[U]
Int. Cl.² E04H 17/14
U.S. Cl. 256—65 7 Claims



1. An interlocking construction for balustrades to be secured to a foundation, which comprises:

a. a bracket having means at one end adapted to be mounted on the foundation, said bracket having an arm at its other end, said arm terminating in a first locking prong;

b. a securing member connected at one end to said bracket and having its other end formed into a second locking prong;

c. A handrail having a pair of peripherally spaced-apart locking means each extending along the length of the handrail, said first and second locking prongs engaging said locking means to grip said handrail in place on said arm and said securing member; and

d. said arm and said securing member jointly providing a continuous surface conforming to the portion of the peripheral surface of said handrail lying between said pair of locking means, and supporting said handrail thereon.

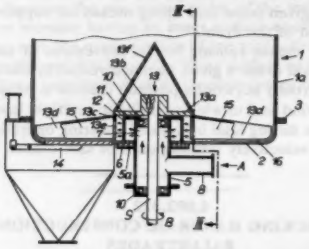
4,002,323
ARRANGEMENT FOR MIXING AND TREATING POWDERED AND GRANULAR MATERIAL

Gustav Grün, Ortenberg, Lissberg, Germany, assignor to Luco-Technic AG, Zurich, Switzerland

Filed Aug. 7, 1975, Ser. No. 602,744
Int. Cl.² B01F 7/16, 15/00
U.S. Cl. 259—8 7 Claims

1. Apparatus for mixing and treating powdered and granular

material by means of compressed gas comprising, in combination, mechanically driven mixing means with an upright cylindrical mixing tank having an intake for the material to be mixed and an outlet for the mixed material, said tank having a flat bottom; rotating hub means directly above said flat bottom of said mixing tank; at least one stirring paddle with wall panels fastened to said hub and leaving a vacant space between said flat bottom of said tank and said wall panels of said



stirring paddle, said vacant space extending from said hub means to the outside wall of said mixing tank; supply channel means for passing compressed gas through said hub means into said vacant space; slit means between said hub means and said wall panels of said stirring paddle and adjacent tank wall sections for the exit passage of compressed gas into said mixing tank along the entire stirring paddle from said hub means to said outside wall.

4,002,324

METHOD FOR CONTINUOUSLY MIXING A POWDER IN A LIQUID

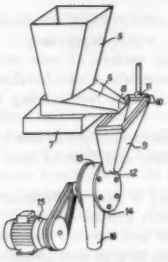
Joël Huet, Vernon, France, assignor to The Societe Dilumelt, Vernon, France

Filed Nov. 12, 1974, Ser. No. 523,153

Claims priority, application France, Mar. 20, 1974, 74.09512; Nov. 14, 1973, 73.40496

Int. Cl.² B01F *7/04, 15/02;* **B02C** *13/08*

U.S. Cl. 259—9 **1 Claim**



1. A method of dispersion of a powder in a liquid and particularly a powder having a considerable solvation capacity with respect to a liquid in which said powder is intended to be dispersed, wherein said method entails the successive steps which consist:

in discharging the liquid about a perimeter in an overall direction substantially orthogonal to said perimeter at each point of discharge, to form a liquid envelope which defines a liquid flow passage between a pouring point and an atomization station,

in continuously introducing the powder into the liquid flow passage at the pouring point so as to guide said powder to the atomization station within and together with its liquid envelope, the ratio of flow rates of powder and of liquid being equal to the desired dispersion ratio,

in atomizing the liquid flow passage containing the powder at the atomization station to disperse the powder in the liquid, and

in producing a partial pressure at the lower end of the liquid flow passage in order to subject the powder and the liquid to suction and to carry out subsequent atomization and dispersion in an aerated medium.

4,002,325

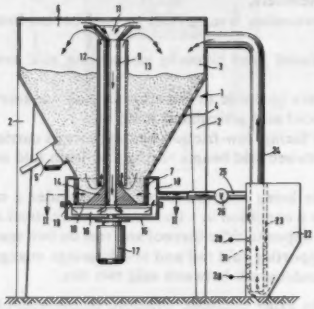
APPARATUS FOR MIXING POWDERY OR GRANULATED MATERIALS

Friedrich W. Herfeld, Wall 1, Neuenrade, Germany

Filed Mar. 22, 1976, Ser. No. 669,022

Int. Cl.² B01F *5/00, 5/16;* **F26B** *17/00*

U.S. Cl. 259—23 **14 Claims**



1. Apparatus for mixing powdery or granulated materials, comprising a mixing container narrowing downwards like a funnel, an ascending pipe placed in the vertical axis thereof, an air supply pipe concentrically provided within the ascending pipe, a radial fan situated in the root portion of the mixing container, whereby the air supply pipe extends into the suction space thereof, and the annular pressure space of which containing blast openings which are directed on to the inlet opening of the ascending pipe.

4,002,326

HOMOGENIZATION STIRRER

Hans G. Brogli, 42 Gotthelfstrasse, Basel, and Werner F. Brogli, 3 Kindergartenstrasse, Reinach, both of Switzerland

Filed Mar. 7, 1975, Ser. No. 556,327

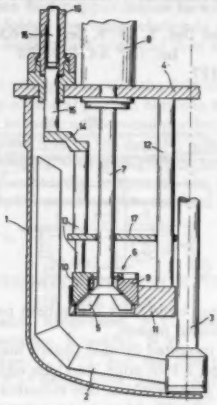
Claims priority, application Switzerland, Mar. 11, 1974, 3353/74

Int. Cl.² B01F *5/06, 5/16*

U.S. Cl. 259—95 **2 Claims**

1. A homogenization stirrer for use with materials having differing ranges of viscoscity and homogeneity, the stirrer comprising; a rotor, a stator spaced from said rotor and defining a rubbing gap, means for rotating said rotor relative to said stator and including rotor blades for sucking a medium axially from one side and thrusting it axially towards the side opposite said one side, said stator comprising two interengaging parts both located on one and the same side of said rotor and defining a plurality of passage gaps between said two parts, said passage gaps forming a plurality of passages through which said medium is passed out of said stator for homogenizing the same, and means for axially adjusting spacing of one of said

two parts in relation to the other part of said two parts for adjusting the width of said passage gaps in said stator and thus



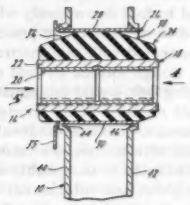
back pressure and flow rate to determine dwell time of the medium in the rubbing gap.

4,002,327

RESILIENT BUSHING

James J. Damon, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 23, 1974, Ser. No. 535,929
Int. Cl.² F16F 1/16
U.S. Cl. 267—57.1 A 1 Claim



1. A suspension construction for a motor vehicle comprising a suspension link, a vehicle frame component and a resilient bushing assembly interconnecting said link and said component;

said bushing assembly comprising an inner cylindrical member having serrated ends engaging said component;

an annular elastomeric body surrounding said inner cylindrical member;

an outer generally tubular member surrounding said elastomeric body and connected to said suspension link;

said outer member having first and second halves disposed on either side of a plane containing the axis of aid inner cylindrical member and arranged perpendicular to the longitudinally axis of said suspension link;

said first half of said outer member being semi-cylindrical in shape;

said second half being generally semi-cylindrical with a pair of circumferentially spaced apart inwardly extending flutes;

said inner cylindrical member being coaxially arranged with respect to said outer member;

the radial distance between said inner member and said flutes of said outer member being substantially less than the radial distance between said inner member and said outer member;

said elastomeric member having a cylindrical inner surface complementing the outer surface of said inner member and an outer surface with a pair of circumferentially spaced flutes complementing the inner surface of said outer member;

said inner and outer surfaces of said elastomeric member being in flush engagement with said inner and outer members, respectively;

said elastomeric member having beveled edge portions adjacent said first half that extend inwardly of the outer edges of said first half,

said resilient bushing assembly being constructed to provide a first spring rate for linear displacement of said suspension link in a first direction perpendicular to said plane in which said inner member is displaced toward the center of said first half of said outer member;

said resilient bushing assembly being constructed to provide a second spring rate for linear displacement of said suspension link in a second direction that is opposite to said first direction;

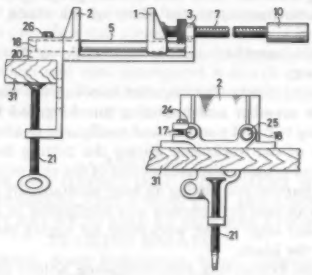
said first spring rate being substantially less than said second spring rate.

4,002,328

VISE

Robert Wolf, Im Kiesacker, 5446 Engeln; Klaus Walter Moller, Karlstrasse 25, 7016 Gerlingen, and Leo Klapperich, 5441 Weibern, all of Germany

Filed Oct. 6, 1975, Ser. No. 619,916
Claims priority, application Germany, Feb. 6, 1975, 2504897; Mar. 26, 1975, 2513319; July 10, 1975, 2530776
Int. Cl.² B23Q 3/02
U.S. Cl. 269—97 9 Claims



1. A vise in combination with a C clamp for attaching the vise to a work bench in various positions, said vise comprising:

a movable jaw;

a spindle to move said movable jaw;

a quick release mechanism to provide coarse adjustment of said spindle and said movable jaw;

a base plate with a fixed jaw and with a fixed abutment block, which is penetrated by said spindle, and two parallel guide bars for said movable jaw extending between said fixed jaw and said abutment block, said bars penetrating said fixed jaw and extending to form two plugs projecting at the outside of said fixed jaw; said C clamp having clamping screw means for clamping a work bench or the like and a basic body which is provided with a first receiving hole to receive one of said plugs and further provided with at least three further holes extending parallel to the first hole and distributed over a circular arc spaced apart at 90° with respect to said first hole as a

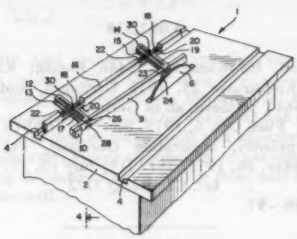
center and adapted to receive alternatively the other of said plugs and said first center hole used for all positions being provided with a further clamping means to clamp the inserted plug in any of its diametral directions.

4,002,329

WORKPIECE SUPPORT DEVICE

Adam Petrowski, Port Chester, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Mar. 17, 1976, Ser. No. 667,717
Int. Cl.² B23Q *3/18*
U.S. Cl. 269—318 **4 Claims**



1. A device for supporting a workpiece for the cutting thereof on a power saw of the type having a table, a blade extending from the table and a miter gauge groove disposed on the table parallel to the plane of the blade, said device comprising:

a. a guide member slidably mountable in the miter gauge groove;

b. a workpiece holder disposed between the blade and said guide member and including an elongated first portion having two end portions and configured to abut against an edge of the workpiece during the cutting thereof and a second portion disposed at one of the end portions of said first portion and having an edge substantially perpendicular with said first portion and configured to abut against another edge of the workpiece for urging the workpiece into the blade;

c. means connecting said workpiece holder to said guide member for both rotational and translational movement of both end portions of said first portion with respect to said guide member, said connecting means comprising a pair of joining means each including at least one arm member spaced apart a given distance from the arm member of the other joining means and having an end portion rigidly connected to said first portion of said workpiece holder and disposed substantially perpendicular thereto and extending toward said guide member, said joining means further including a first longitudinal slot of a given width in each arm member and wherein said connecting means further comprises two colinear second longitudinal slots in said guide member having two innermost and two outermost points with respect to each other and having said given width, wherein the distance between the two outermost points thereof is greater than said given distance and the distance between the two innermost points thereof is less than said given distance, and a pair of fastener means each engaged in the first longitudinal slot of one arm member and the corresponding second longitudinal slot of said guide member; and

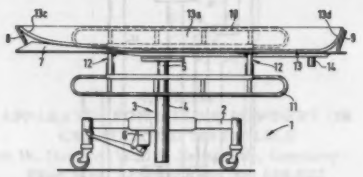
d. means for releasably fixing said workpiece holder in a desired position with respect to said guide member.

4,002,330

PATIENT SUPPORTING TABLE

Hans Arne V. Johansson, Treharadsvagen 36, Eslov, Sweden (S-241 OO)

Filed Dec. 5, 1975, Ser. No. 638,059
Int. Cl.² A47C *27/08*
U.S. Cl. 269—327 **12 Claims**



1. A supporting table for a recumbent patient, comprising:

supporting chassis means;

a table plate mounted on said chassis means, and including a head edge, a foot edge, and side edges;

a plurality of gate members, one mounted along each of said edges of said table plate in an erect position extending upwardly from the plane of said plate;

means mounting the gate member along at least one of said side edges for pivotal movement between said erect position, and an inoperative position disposed beneath the plane of said table plate;

a mattress received on said table plate, and including a central portion, a head portion, a foot portion, and side portions, said head, foot and side portions being supported in upwardly extending relationship relative to said central portion by said erect gate members whereby said mattress forms a trough, said mattress side portion supported by said downwardly pivotable side gate member being adapted to fold downwardly when said gate member is lowered to its inoperative position;

drain means connected with said mattress for draining liquid from the trough formed by said mattress, said drain means emptying below said table plate, and said central portion of said mattress being arranged to slope toward said drain means to facilitate removal of said liquid; and

at least one pair of attachment members carried by said mattress and adapted to detachably secure said mattress to said table plate, said attachment members including first hook means adapted to grip a first one of said side edges, and second hook means adapted to grip the other of said side edges, whereby said mattress will remain in place on said table plate as a patient is transferred to or from said supporting table.

4,002,331

FLAT MATERIAL FOLDING DEVICE

Brett W. Kraft, and Barbara J. Porter, both of P.O. Box 7184, Country Club Station, Kansas City, Mo. 64113

Filed June 4, 1975, Ser. No. 583,622
Int. Cl.² B65H *45/00*
U.S. Cl. 270—61 R **11 Claims**

1. An apparatus for folding napkins and the like and comprising:

a. a housing having an entrance for napkins to be folded, said napkins having opposed ends and opposed sides;

b. napkin advancing means adjacent said entrance for receiving and engaging an intermediate portion between ends of a napkin forming a fold and advancing the napkin along a path with said fold being a leading fold edge thereof and the napkin sides being adjacent sides of said path;

c. means on said housing and positioned in the napkin path and engageable by said leading fold edge of the napkin and operative to stop the advancing movement thereof;

d. gripper means movably mounted relative to said housing

and operative to engage and grip portions adjacent said opposed sides of the napkin in spaced relation to said leading fold edge thereof and to move portions of the napkin between said gripper means forwardly relative to said path into folded overlying relation to napkin portions adjacent said leading fold edge and then release said side portions;

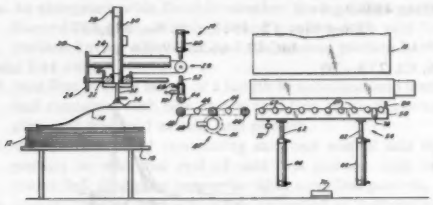
e. folding means engageable with the folded overlying napkin portions at a central portion between the napkin sides and operative to move said central portion transversely to form a transverse fold in the napkin; and means on said housing cooperating with said gripper means for urging same laterally outwardly relative to the napkin path to tension the napkin portions between said gripper means.

4,002,332

AUTOMATIC FEED MECHANISM FOR POWER BRAKE OR THE LIKE

Gustave Hoenigmann, Ridgewood, N.Y., assignor to Acme Steel Door Corporation, Brooklyn, N.Y.

Filed Apr. 9, 1975, Ser. No. 566,173
Int. Cl.² B65H *3/08, 5/06, 5/04*
U.S. Cl. 271—11 8 Claims



1. A feed mechanism for a power brake or the like comprising:

a frame;

means for supporting a stack of sheets to be fed to said power brake;

means secured to said frame for lifting a single sheet vertically from said stack and for transporting said sheet horizontally to a roller means, said lifting means comprising a trolley mounted to said frame for horizontal movement between a first position over said stack support and a second position, means for driving said trolley between said first and second positions, a cylinder mounted to said trolley for movement therewith, a piston disposed within said cylinder for vertical movement, said piston having a lower end extending out of the bottom of said cylinder, means for moving said piston within said cylinder between a lowered position and a raised position, suction cup means affixed to said piston lower end, and means for applying and removing suction from said suction cup;

roller means for transporting said sheet horizontally to a lifting station, said roller means including a first roll substantially aligned with said trolley second position and affixed to said frame at a height substantially equal to the level of said suction cup when said piston is in said raised position, a plurality of additional rolls extending between said first roll and said lifting station, means for driving said rolls, a pinch roll mounted to said frame for vertical movement aligned with said first roll, means for moving said pinch roll vertically between an upward position spaced apart from said first roll and a downward position, switch means in controlling relationship with said pinch roll moving means and disposed in the path of movement of said trolley, said switch means being operative to cause said pinch roll moving means to drive said pinch roll to said downward position when said trolley is in said second position;

a lifting station adjacent said power brake, said station including an elevator bed for receiving said sheet and raising said sheet from a first level equal to that of the roller means to a second level above said first level and substantially equal to that of the power brake inlet; and,

means for driving said elevator bed.

4,002,333

RAINBOW PHENOMENON DEVELOPING DEVICE

Hideyuki Gotoh, 405, Shioya 1-chome, Otaru, Hokkaido, Japan

Filed Aug. 4, 1975, Ser. No. 601,305
Claims priority, application Japan, Jan. 11, 1975, 50-5664
Int. Cl.² F21P *1/02*
U.S. Cl. 272—8 D 6 Claims

1. A rainbow phenomenon developing device comprising an arched framework secured at the opposite ends to spaced support structures and upheld at the apex by an intermediate supporting means and including a pair of spaced and parallel side frames and an arched top frame connecting the upper portions of said side frames, a plurality of differently colored transparent panels surrounding said side frames in a spaced and parallel relationship to the side frames, illumination means mounted on said side frames for illuminating said transparent panels, from within, water supply pipes positioned between said side frames and panels and a plurality of fine water spray nozzles extending from said water supply pipes through said panels for spraying fine water particles in a mist form so as to provide a mist atmosphere about said framework whereby a rainbow phenomenon is developed about the framework when said mist atmosphere is struck upon by the light rays from said illumination means which have passed through said colored transparent panels.

4,002,334

DUAL FRAME OFFSET DISC IMPLEMENT WITH TONGUE MEMBERS AND A TOW BAR ARRANGED FOR MOVEMENT BETWEEN SIDE BY SIDE RELATION AND A TRAILING RELATION

Jerry L. Wilbeck, South Hutchinson, Kans., assignor to Wilbeck Machine and Manufacturing, Inc., South Hutchinson, Kans.

Filed Sept. 17, 1975, Ser. No. 614,007
Int. Cl.² A01B *65/00*
U.S. Cl. 172—581 12 Claims

1. An earth working apparatus comprising:

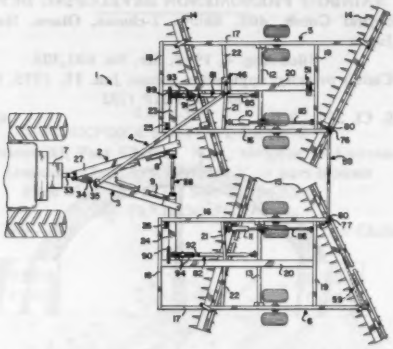
a. first and second spaced mobile frames each having a forward end portion and a rear end portion and laterally spaced side members extending therebetween;

b. means on each of said frames for earth working as said frames are moved forward;

c. first and second tongue members having one end thereof pivotally mounted on the forward end portion of respective first and second of said mobile frames and an other end thereof having connecting means for effecting connection of said frames to each other and to a prime mover for operation in side-by-side relation;

d. spacer means having ends releasably connecting said spacer mobile frames in side-by-side relation and cooperating with said tongue members to maintain spacing of said frames during side-by-side operation, said spacer means being separated from one of said mobile frames for change of relative positions of said frames; and

e. tow bar means having one end portion thereof pivotally mounted on said first mobile frame and the other end portion thereof pivotally mounted on said tongue member of the second mobile frame whereby said mobile frames may be moved from side-to-side relation to a position with said second mobile frame in trailing relation with said first mobile frame upon disconnecting said



second tongue from said first tongue and separating of said spacer means from one of said mobile frames, said pivotal mounting of said one end portion of the tow bar means on said first mobile frame and said other end portion of the tow bar means on the tongue member of the second mobile frame being maintained during side-by-side relation and trailing relation and movement of the mobile frames from one to the other of said relations.

4,002,335

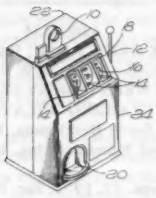
TOY BANK WITH COIN RETURN

Richard B. Bailey, 3000 Dunes Circle, Reno, Nev. 89502

Continuation of Ser. No. 440,908, Feb. 8, 1974, abandoned. This application July 28, 1975, Ser. No. 599,742

Int. Cl.[2] A63H *33/30;* **A63F** *5/04*

U.S. Cl. 273—1 E **2 Claims**



1. A toy bank, as for accumulating coins, comprising:

spinning-reel means movable to designate a plurality of predetermined winning positional combinations;

drive means for actuating said spinning-reel means and to halt said spinning-reel means in sequence under manual control in various positional combinations;

coin-delivery means including a sliding leaf and rotary means to move said leaf in a reciprocal pattern for dispensing coins;

a set of feeler arms for mechanically sensing winning positional combinations of said reels;

a plurality of switch means selectively closed by said feeler arms in accordance with specific of said winning positional combinations;

an electric motor;

a gear train for coupling said motor to said rotary means of said coin-delivery means;

a plurality of switch terminal contacts individually connected to said like plurality of switch means;

a rotary contact means including a conductive segment upon which said terminal contacts dwell;

a gear segment means coupled to said rotary contact means and actuated by said drive means for resetting said rotary contact means to receive said terminal contacts upon actuation of said drive means, said gear segment means also being actuated by said gear train for sequential stepping motion to sequentially advance said conductive segment from positions of contact with said terminal contacts in incremental steps related to rotations of said rotary means of said coin-delivery means; and

means for energizing said electric motor through said switch means and said conductive segment to actuate said coin-delivery means whereby to operate said coin-delivery means in accordance with the states of said switch means as closed by said feeler arms.

4,002,336

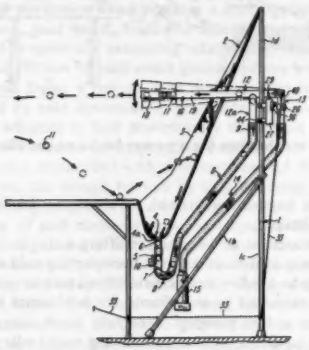
TABLE TENNIS TRAINING DEVICE

Dennis Beaver, 962 Eden Isle Drive N.E., St. Petersburg, Fla. 33704; J. R. Hensley, 1335 Old Country Drive, Dayton, Ohio 45414, and Jerry Duff, 4240 Wagner Road, Dayton, Ohio 45440

Filed May 12, 1975, Ser. No. 576,557

Int. Cl.[2] A63B *39/00*

U.S. Cl. 273—30 **11 Claims**



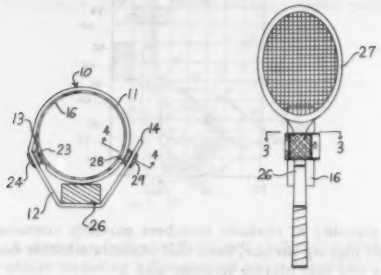
1. A table tennis training device for use in connection with a table tennis table, which includes: a stand adapted to be placed at one end of a table tennis table, a tennis ball catcher supported by said stand and comprising a screen having a front side forming the side intended to face the table tennis table in connection with which said training device is to be used, said screen also comprising a rear side and being provided with a pocket on said front side for catching and gathering table tennis balls thrown onto the front side of said screen, a gun supported by said stand and arranged on the rear side of said screen, said gun having a barrel extending from the rear side of said screen through the latter to the front side thereof, first conduit means leading from said pocket to said barrel for establishing communication between said pocket and said barrel and for conveying table tennis balls from said pocket into said barrel, air blower means, second conduit means having one end thereof connected to said air blower means for communication therewith and having its other end connected to said barrel for communication therewith at an area more remote from the front side of said screen than the area where said first conduit leads into said barrel, and a partition with an orifice of substantially smaller diameter than the internal diameter of said second conduit, said partition being interposed between those areas where said first and second conduit means respectively lead into said barrel.

4,002,337

DEVICE FOR SUPPORTING A BALL CONTAINER FROM A TENNIS RACKET

Donald K. Rayfield, No. 9 Crestwood Drive, Oneonta, Ala. 35121

Filed Oct. 2, 1975, Ser. No. 618,744
Int. Cl.² A63B 61/00
U.S. Cl. 273—73 R 1 Claim



1. The combination with a cylindrical tennis ball container and an elongated handle of a tennis racket:

a. an elongated, wide flexible member having a first portion formed integrally with a second portion with said first portion having a free end and said second portion having a free end,

b. said first portion being of a length to surround said tennis ball container with one end of said first portion overlapping said free end of said first portion,

c. means detachably connecting said one end of said first portion to said free end of said first portion with said tennis ball container secured within said first portion,

d. said second portion defining an extension of said one end of said first portion and being of a length to extend around said handle of a tennis racket positioned alongside said tennis ball container secured within said first portion with the free end of said second portion terminating at a location alongside the outer surface of said first portion to provide sufficient length in said second portion to surround said handle of a tennis racket, and

e. means detachably connecting the free end of said second portion to said first portion at said location with said handle of a tennis racket secured in place between said second portion and said first portion.

4,002,338

AMUSEMENT GAME DEVICE

William V. Gamber, Huron, S. Dak., assignor to Jerry D. Elias

Filed June 12, 1975, Ser. No. 586,365
Int. Cl.² A63F 7/06, 7/10
U.S. Cl. 273—122 A 8 Claims

1. An amusement game device comprising:

support means;

frame means secured to said support means;

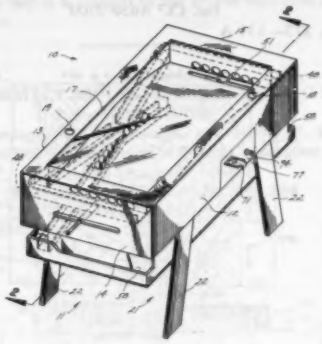
a longitudinal arcuate playing surface having depending ends mounted in said frame means;

a pair of spaced goal means secured to said frame means with one of said goal means disposed proximate each end of said playing surface;

at least one ball rollerably supported on said playing surface;

a pair of flipper means mounted in said frame means with one of said flipper means disposed proximate each goal means for striking said ball and propelling it away from said goal means on one end of said playing surface and toward said goal means on the other end of said playing surface;

wherein each said flipper means includes a rod disposed transversely of said playing surface and secured on its ends to said frame means; a sleeve slidably mounted on said rod; a tube transversely secured to said sleeve; a plunger slidably mounted in said tube and having one end projecting axially thereof; a vertically disposed post pivotally secured on one end to said tube; a flipper bar secured to the other end of said post and disposed above said playing surface proximate said goal means; and a linkage



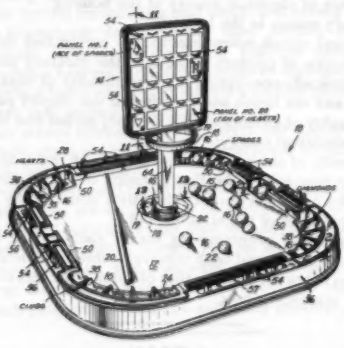
having one end secured to said plunger and having another end thereof secured to said post, wherein movement of said plunger causes said linkage to pivot said post and the said flipper bar from a first position to a second position.

4,002,339

POKER POOL GAME

Lawrence L. Reiner, 1 Hickory Lane, Woodbury, N.Y. 11797, and William A. Brady, 243 Teaneck Road, Ridgefield Park, N.J. 07660

Filed Nov. 20, 1974, Ser. No. 525,287
Int. Cl.² A63F 7/00
U.S. Cl. 273—123 A 20 Claims

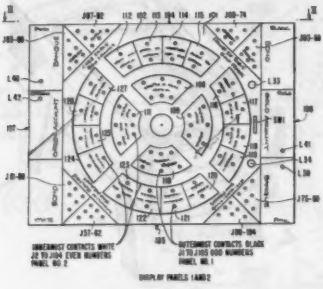


1. A pool-like game employing a plurality of balls comprising: a level or horizontal playing surface, a plurality of ball receiving pockets about said playing surface, conductive contact means in each of said pockets responsive to a pocketed ball, means in the form of a score board having a predetermined indicium for each of said pockets, and being electrically connected to said conductive contact means, for scoring said indicium upon response to a pocketed ball; at least one, but not all of said conductive contact means being normally closed and removing from said score board means the scored indicium for at least one pocketed ball; and means for supplying electrical power to said score board means.

4,002,340
GAME APPARATUS

LeForest V. Alcorn, Forestville, Conn., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed June 26, 1975, Ser. No. 590,605
Int. Cl.² A63F 3/00
U.S. Cl. 273—131 A 5 Claims



1. Game apparatus, comprising

a housing of substantially rectangular parallelepiped configuration having a top and a bottom in spaced substantially parallel relation, a first pair of sides in spaced substantially parallel relation substantially perpendicular to the top and bottom and a second pair of sides in spaced substantially parallel relation substantially perpendicular to the top and bottom and to the first pair of sides;

a pair of display panels each at a corresponding one of the first pair of sides of the housing and each having a plurality of display lamps thereon positioned in spaced relation in rows and columns, a pair of rotary switches thereon, a pair of ON-OFF switches and a pair of color indicating display lamps;

a first plurality of spaced electrical contact sockets positioned in a predetermined arrangement on the top of the housing;

a second plurality of spaced electrical contact sockets positioned on one of the second pair of sides of the housing;

a source of electrical energy in the housing;

memory means in the housing;

electrical circuit means electrically connecting the second plurality of contact sockets to the memory means and electrically connecting the first plurality of contact sockets and the lamps and switches of the display panels in a plurality of circuits via the memory means and the source of electrical energy;

a plurality of electrical contact plugs each removably insertable into any of the first plurality of contact sockets to make electrical contact therewith and thereby close selected ones of the circuits; and

a plurality of programming means each having electrical contact plugs and each removably insertable into selected ones of the second plurality of contact sockets to program the memory means.

4,002,341
BOARD GAME OF THE HARE AND TORTOISE

Kenneth Gan Gee Chin, Elmhurst, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Jan. 23, 1976, Ser. No. 651,803
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 G 6 Claims

1. A board game, which comprises:

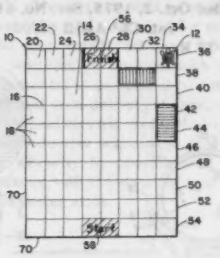
a. a playing board having a top playing surface thereon, said top playing surface subdivided into a plurality of playing squares;

b. two of said playing squares being a start position;

c. two of said playing squares being a finish position;

d. vertical boards extending upwardly from each side of said finish and said start positions;

e. two movable playing pieces movable on said playing squares;



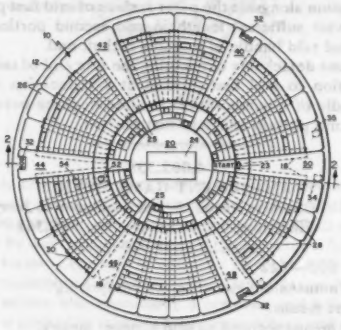
f. a plurality of obstacle members movably contained on said playing surface, each said obstacle member occupying two said playing squares; and

g. a die for indicating the number of said playing squares to move each said movable playing piece.

4,002,342
STOCK MARKET INVESTMENT GAME

Fred Conner Biggs, 751 Rosecrans St., San Diego, Calif. 92106

Filed Jan. 15, 1976, Ser. No. 649,212
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 AE 10 Claims



1. A game comprising:

a game board having a continuous path divided into a plurality of spaces representing individual stocks,

a playing piece for progressing along said path from space to space,

recording means for recording the purchase price of stock shares corresponding to the location on said path of said playing piece, said recording means comprising a series of radial spaces each marked with market condition averages,

random number generating means for designating a number of spaces to be moved by said playing piece,

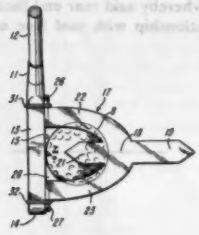
and market conditions biasing means for adjusting the market condition average and biasing share prices of said stocks according to a number generated by said random number generator.

4,002,343

PUTTER POINTER

Albin F. Eckert, 5068 Scotsman Drive, Dayton, Ohio 45414

Filed July 7, 1975, Ser. No. 593,701
Int. Cl.² A63B 53/00
U.S. Cl. 273—163 R 10 Claims



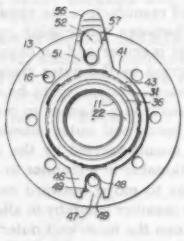
1. A direction indicator for a golf club comprising a plate-like object including a first portion and a second portion, said first portion being bent at substantially a right angle to said second portion and providing means to be placed in contact with at least one face of the head of a golf club to position said second portion to project outwardly of the striking face of the club and in overlying relation to a golf ball positioned adjacent the striking face, said plate-like object being formed to provide an opening in said second portion through which said golf ball may be observed, within the limits of which opening projects a portion of the plate-like object which defines a first pointer the projected extremity of which will terminate over a ball properly positioned at the striking face of said club, and a second pointer, said first and second pointers being directly aligned and oppositely projected to provide that one thereof may be directed towards a hole or flag while the other thereof is directed to a landmark positioned rearwardly of the striking face of the club, to provide thereby a line of sight through which the head of the club should be swung in moving the golf ball to the hole or flag.

4,002,344

SNAP-IN FLANGE SEAL AND LOCATOR

Franklyn D. Smith, 88 W. Jackson St., Hayward, Calif. 94544

Filed Nov. 12, 1975, Ser. No. 630,972
Int. Cl.² F16J 15/06
U.S. Cl. 277—11 11 Claims



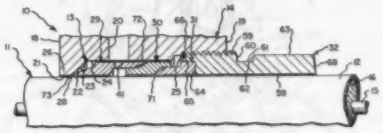
1. A seal to be interposed between the two flanges of the abutting pipes or conduits, said flanges each having a plurality of bolt holes arranged in one of at least two plurality of bolt circles of different radii, said seal comprising a seal proper having means to form a tight pressure differential seal against both said flanges when said flanges are drawn together by tightening bolts through aligned bolt holes, said seal proper having an inside diameter no less than the inside diameter of said pipes or conduits, and a locating ring engaging the outside edge of said seal proper, said locating ring formed with a radially projecting ear, said ear formed with an opening which has a narrower portion near said seal proper and wider portion farther from said seal proper, said narrower portion being tangent to a first bolt hole on the smaller of said bolt hole circle, said wider portion being tangent to a second bolt hole on the larger of said bolt hole circles, whereby said seal proper may be located concentric with the pipe or conduit by moving said ear so that it is tangent to the proper bolt hole of one of said flanges.

4,002,345

SEAL ASSEMBLY SEQUENTIALLY PROVIDING SPACED SEAL ZONES

Roman Jankowiak, Cheektowaga, and David M. Okonzak, Elma, both of N.Y., assignors to Conax Corporation, Buffalo, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,233
Int. Cl.² F16J 15/08
U.S. Cl. 277—110 9 Claims



1. A seal assembly adapted to provide a seal between a body member having an opening therethrough and an object having a cylindrical outer surface arranged to penetrate said opening, said body member being bounded by a cylindrical surface portion and a rearwardly-facing annular shoulder, said seal assembly comprising:

a lead ferrule surrounding said object and having a forwardly-convergent frusto-conical first surface proximate its front end adapted to engage said body member shoulder to receive a radial unit load, and having a rearwardly-divergent frusto-conical second surface proximate its rear end, said second surface being adapted to receive a smaller radial unit load than said first surface;

an intermediate annular follower surrounding said object and having a forwardly-facing annular shoulder adapted to engage said second surface, and having a rearwardly-facing annular shoulder;

a rear ferrule surrounding said object and having a forwardly-convergent frusto-conical third surface adapted to engage said rearwardly-facing follower shoulder, and having a bearing surface proximate its rear end, said third surface being adapted to receive a smaller radial unit load than said second surface; and

thrust means surrounding said object and adapted to selectively exert a desired longitudinal force on said rear ferrule bearing surface,

whereby, when said thrust means exerts such desired force, seal zones are sequentially provided between a forward marginal portion of said lead ferrule and said object, a rearward marginal portion of said lead ferrule and said body member, and a forward marginal portion of said rear ferrule and said object, to provide a seal between such penetrant object and said body member.

4,002,346

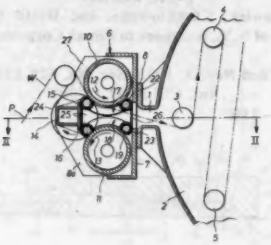
ROLLER SEALING HEAD FOR OVERPRESSURE AND UNDERPRESSURE CONTAINERS

Karl Peter Lopata, and Gunter Schiffer, both of Krefeld, Germany, assignors to Kleinewefers Industrie Companie GmbH, Krefeld, Germany

Filed July 2, 1975, Ser. No. 592,782
Claims priority, application Germany, July 3, 1974, 2431900
Int. Cl.² B65D 53/00
U.S. Cl. 277—237 R 8 Claims

1. A roller sealing head for overpressure and underpressure

containers, especially for use in the textile industry, which includes in combination: a housing, a first rotatable sealing roller supported by said housing, a second rotatable sealing roller supported by said housing and arranged in spaced relationship to said first sealing roller, a rotatable auxiliary roller formed by a hollow roller and supported by said housing while being located adjacent to both said first sealing roller and said second sealing roller, said auxiliary roller having a width less than that of said first and second sealing rollers, said auxiliary roller and one of said sealing rollers being operable to directly convey therebetween a web of goods to be processed, two



endless sealing strips respectively associated with said first and second sealing rollers and each sealing strip having two oppositely located substantially straight sections and two curved sections respectively interconnecting the ends of said straight sections, only one of the straight sections of each endless sealing strip engaging the inside of said auxiliary roller while the curved sections of the sealing strips as well as the second straight sections of each sealing strip are operable to engage the respective adjacent sealing roller when no web of goods is passing therebetween and seal a web of goods when such web passes therebetween.

4,002,347

TORQUE-TRANSMITTING SYSTEM

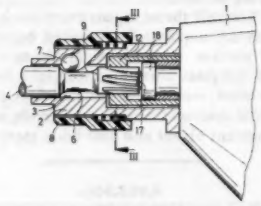
Karl Wanner, Echterdingen; Jorg Falchle, Bempflingen; Wolfgang Schmid, Plattenhardt; Manfred Bleicher, Leinfelden; Reinhard Hahner, Kemnat, and Werner Kleine, Jr., Uphusen, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Jan. 16, 1975, Ser. No. 541,222

Claims priority, application Germany, Jan. 17, 1974, 2402113; Feb. 22, 1974, 2408557

Int. Cl.² B23B *31/10*; B25D *9/04*

U.S. Cl. 279—19.3 **10 Claims**



9. In a torque-transmitting system, a combination comprising a housing having a tool holder section rotatable in a predetermined direction; a driven output shaft journalled in said housing and having a free end portion at said tool holder section; a tool having a shank provided with a front portion and with a rear portion which is of profiled cross-section and has a rear end face, the profiling of said rear portion extending lengthwise of said shank and also being inclined relative to the longitudinal axis of said tool towards said front portion at an angle of twist of between substantially 70°–85° and circumferentially of said rear portion in said predetermined direction; and a receiver for said rear portion formed in said tool holder section and having portions configurated for matingly receiving the profiled rear portion and coacting with the latter for drawing said tool axially inwardly into said tool holder section in response to rotation of the latter due to the coaction between the inclined profiling and said portions of said tool holder section, whereby said rear end face is held in motion-transmitting relationship with said free end portion of said shaft.

4,002,348

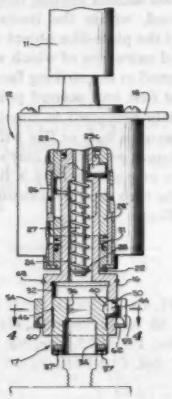
SAFETY RELEASE DEVICE USEFUL IN TAPPING ATTACHMENTS

Allan S. Johnson, Newport Beach, Calif., assignor to Tapmatic Corporation, Irvine, Calif.

Filed May 7, 1975, Ser. No. 575,359

Int. Cl.² B23B *5/22*

U.S. Cl. 279—75 **3 Claims**



1. As an article of manufacture, an apparatus for providing a releasable joint between telescoping cylindrical members comprising an inner member and an outer member, radially movable means carried by the outer member, and the inner member having means constructed to be engageable by said radially movable means in a manner to prevent relative axial movement of the inner and outer members, and relatively movable actuator means carried by the outer member and having means positionable in a manner to allow the said radially movable means to move outward radially to disengage from the said inner member whereby to allow for relative axial movement as between the inner and outer members, wherein said actuator means is deformable sufficiently whereby in response to predetermined torque load, said radially movable member can be moved radially sufficiently to disengage from the inner member, wherein the said actuator means is in the form of a split ring, wherein said inner member has a recess having the shape of a part of a sphere, said radially movable means being a ball, said inner member having a helical groove in it, said recess being at one end of the said groove whereby upon stoppage of rotation of the inner member while the outer member continues to rotate, said radially movable ball can follow said helical groove, causing the outer member to move axially relative to the inner member.

4,002,349

SKI CLIP DEVICE

Kip H. Dopp, 810 7th Ave., Salt Lake City, Utah 84103

Filed Nov. 24, 1975, Ser. No. 634,427
Int. Cl.² A63C *11/02*
U.S. Cl. 280—11.37 A **13 Claims**

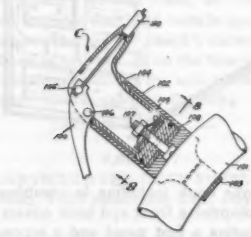
1. A device for securing a pair of skis together in a base to base relationship, said device comprising a first clip member which includes a bottom wall and side walls formed to present a generally U-shaped cross section defining a generally elongate channel therein, each end of said clip member being open and the outer terminations of the side walls defining the sides of the opening of the channel, said channel being dimensioned to receive thereinto a portion of the sides of the pair of skis and the outer terminations of the side walls being formed into generally flat surfaces, with the sides of the channel opening being tapered to accommodate the taper of the top surfaces of the skis when positioned in a base to base relationship, the generally flat surfaces of the outer terminations thereby contacting and gripping the top surfaces of the skis to hold the skis together.

4,002,350

SINGLE LEVER CONTROL FOR VARIABLE SPEED BICYCLES AND THE LIKE

Norman E. Timbs, 10421 Beckford Ave., Northridge, Calif. 91324

Continuation-in-part of Ser. No. 558,673, March 17, 1975, Pat. No. 3,934,492, which is a continuation of Ser. No. 428,029, Dec. 26, 1973, abandoned. This application Oct. 16, 1975, Ser. No. 622,817
Int. Cl.² B60K *20/02*
U.S. Cl. 280—236 **7 Claims**



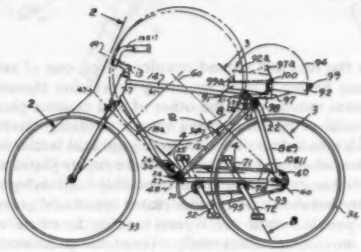
1. A vehicle and single lever control for the simultaneous actuating and conditioning of the brakes and transmission thereof, and including; a frame with wheeled suspension for mobility, brake means operating with at least one wheel to decelerate the vehicle, transmission means operating with at least one wheel to propel the vehicle with torque applied therethrough from a prime mover, and a single manually operable lever compressible in one plane to actuate the brake through coupling means therebetween, and rotatable in an other plane to condition the transmission through coupling means therebetween.

4,002,351

FOLDING BICYCLE

Daniel R. Zuck, 14273 Beaver St., San Fernando, Calif. 91342

Filed Mar. 17, 1972, Ser. No. 235,532
Int. Cl.² B62K *3/14, 15/00*
U.S. Cl. 280—278 **3 Claims**



1. A folding bicycle frame foldable on two axes for tandem riders comprising a front wheel fork assembly, a frame assembly with a rider's seat support, and a rear wheel fork assembly with a pedal crank housing, the rear wheel fork assembly having a lower folding hinge forward of the pedal crank housing attaching the lower rear fork assembly and an upper folding hinge adjacent and aft of the rider's seat support on the frame assembly attaching the upper end of the rear fork assembly to the frame assembly, the frame assembly having rear hinge means to interconnect with the hinges of the upper and lower rear forks and having forward hinge means to connect to the front wheel fork, the front wheel fork assembly having a folding hinge above the wheel and below the frame assembly having hinge axis means on the said fork assembly to permit the front wheel with the rear wheel to fold substantially side by side with the frame assembly between the wheels, seat means and tandem pedal means for a tandem rider comprising a forward seat means and an aft seat means, pivot support means at the aft seat on a level for forward folding of the seat over the forward seat when the bicycle is folded, a pair of aft individual pedal cranks and individual pedal crank support housing means supporting the aft pedal cranks aft of the forward pedal crank housing and forward of the rear wheel axle with the aft pedal crank support housings located to permit the rear wheel to rotate between the said rear pedal crank support housings, interconnecting driving means from the rear pedal cranks to the forward pedal crank to deliver driving torque to the front pedal crank and the rear wheel generated by the tandem rider in the tandem seat.

4,002,352

VEHICLE COUPLING APPARATUS

Clarence H. Hager, Rockford, Ill., assignor to Modern Suspension Systems, Inc., Rockford, Ill.

Filed Jan. 22, 1976, Ser. No. 651,509
Int. Cl.² B60D *1/00*
U.S. Cl. 280—408 **21 Claims**

1. A vehicle coupling apparatus for interconnecting vehicles in a train comprising a first coupler plate, a first connecting means for connecting the first coupler plate to one vehicle, a second coupler plate overlapping a side of the first coupler

plate, a second connecting means for connecting the second coupler plate to a second vehicle, coupler pin means pivotally interconnecting said first and second coupler plates for relative movement about an axis perpendicular thereto; friction brake means including brake pad means mounted on said second coupler plate to engage said first coupler plate at a location spaced outwardly from the coupler pin means, and resilient brake actuating means yieldably biasing said brake pad means against said first coupler plate to provide a preselected frictional force resisting relative angular movement

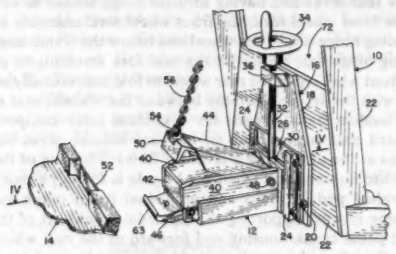
between the first and second coupler plates, one of said coupler plates having a latch receiving depression therein, cam latch means mounted on the other of said coupler plates and having resilient latch actuating means yieldably biasing said cam latch means in a direction to engage said latch receiving depression when said first and second coupler plates are in a preselected angular position for releasably restraining relative movement between said coupler plates out of said preselected angular position until the forces tending to cause relative angular movement substantially exceed the preselected frictional force provided by said friction brake means.

4,002,353

TOWING VEHICLE HAVING A CART-HITCHING MECHANISM

Jerry Sysyn, El Cajon, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 27, 1975, Ser. No. 608,130
Int. Cl.² B60D 1/16
U.S. Cl. 280—490 R **5 Claims**



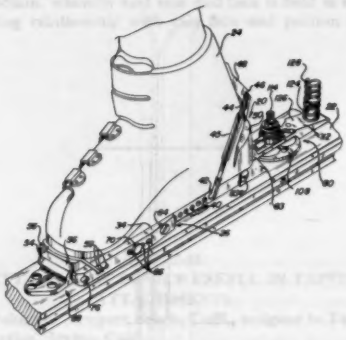
1. In a towing driving vehicle;
a cart hitch mechanism having upper and lower mutually pivotally mounted jaws movable vertically for releasably clamping a cart to be towed;
the pivotal connection being so arranged that said jaws are biased by gravity to a normally closed position;
vertically disposed control means connected to said upper jaw and accessible to the operator of said towing vehicle at his driving station for controlling the opening movement of said jaws;
means mounted on said vehicle for adjustably supporting and guiding said hitch assembly in a vertical direction so that the jaws are vertically movable to accommodate carts of different heights;
means connected to the hitch mechanism and accessible to said operator at his driving station for controlling the vertical position of said hitch assembly.

4,002,354

SKI BINDING

Paul C. Ramer, Rte. 4, P.O. Box 344, Golden, Colo. 80401

Continuation-in-part of Ser. No. 552,970, Feb. 26, 1975, abandoned. This application Oct. 20, 1975, Ser. No. 623,623
Int. Cl.² A63C 9/086
U.S. Cl. 280—614 **10 Claims**



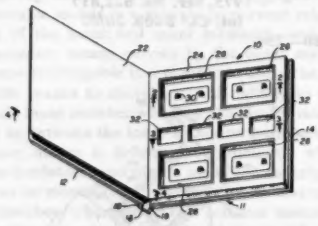
1. A binding for releasably connecting a boot to a ski comprising in combination:
a toe piece mounted on said ski,
laterally extending pin means having cam surfaces on opposite ends thereof, said pin means being operably connected to said toe piece,
a boot plate releasably connectable to said boot having a body portion and semi-rigid elongated member means extending longitudinally of said ski, said elongated member means having recesses on forward ends thereof for releasably receiving said ends of the pin means, said elongated member means flexing laterally outwardly upon release from said pin means, and selectively movable anchor means on said boot plate for anchoring the elongated member means to the boot plate at selected locations along the length of the elongated member means, and
a heel piece mounted on said ski for selectively holding the heel of the boot plate adjacent to the ski.

4,002,355

BOOK WITH SOUND TRACK AND VISUAL DISPLAY

Bernard T. Sendor, 608 Blair Drive, Westbury, Long Island, N.Y. 11429

Filed July 16, 1975, Ser. No. 596,250
Int. Cl.² B42D 1/06
U.S. Cl. 281—29 **10 Claims**



1. A hard cover book including in combination a cover having panels comprising front and back covers of the book, said panels including a first panel and a second panel connected with a spine panel of the cover, a socket panel of much greater thickness than the cover panels of the book, the socket panel being secured to the inside surface of the first panel and

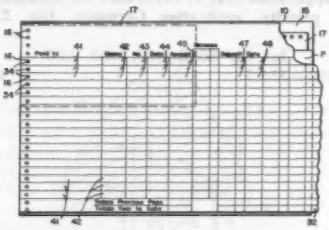
constituting an integral part of one cover of the book, the socket panel having a socket therein facing away from the panel to which it is secured, a filler bound to and within the cover, said filler comprising a group of pages bound together, a tape to which the filler is secured, the tape being secured, immediately beyond a spine portion of the filler, to inner sides of the front and back covers of the book whereby the pages are supported by the front and back covers, in substantially flat condition, when the pages are held open by a reader, end-papers of the filler adhered to and covering the surface of the second panel and part of the surface of the first panel, the filler pages and socket panel being secured to the cover with the top, bottom and front edges of the filler pages and the socket panel being spaced back by substantially equal distances from the corresponding edges of the cover panels to present the appearance, when closed, of a conventional hard cover book.

4,002,356

FOLDABLE CHECKBOOK WITH PEGBOARD STYLE JOURNAL SHEETS

Raymond C. Weidmann, 326 Palmyra Road, Macedon, N.Y. 14502

Filed Aug. 11, 1975, Ser. No. 603,721
Int. Cl.² B41L *3/00*
U.S. Cl. 282—29 B **10 Claims**



1. A checkbook, comprising
a flexible cover,
means for storing a plurality of checks in said cover, each of said checks having on its face a row of data spaces and on its back a strip of carbon which registers with said row of data spaces,
a journal sheet releasably attached to said cover to overlie one side thereof and having on its face a plurality of data spaces arranged in intersecting horizontal rows and vertical columns, and
means for releasably securing said checks on said journal sheet in different operative positions in which the carbon strip on the back of each check registers with a different horizontal row of data spaces on said sheet, and overlies at least certain of the data spaces in the last-named row,
each of said checks having the data spaces on the face thereof arranged so that, when the check is secured in an operative position on said sheet, the data spaces on the check will register with said certain spaces on the sheet which are covered by the check's carbon strip, whereby data entered in said spaces on the face of said check will be entered simultaneously by said carbon strip onto the journal sheet spaces covered thereby.

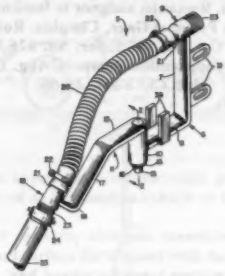
4,002,357

ARTICULATED HOSE SUPPORT

David F. Bennett, 1100 Fleetwood Ave., Daytona Beach, Fla. 32014

Filed July 16, 1975, Ser. No. 596,258
Int. Cl.² F16L *3/00*
U.S. Cl. 285—61 **7 Claims**

1. An articulated hose support comprising a mechanical support including a rigid bracket having a first leg and a second leg disposed at an angle to said first leg, an arm forming a part of said mechanical support having an inner end pivotally connected to a distal end of said second leg for swinging movement about an axis disposed substantially parallel to said first leg, a first rigid conduit section secured intermediate its ends to the distal end of said first leg normal thereto, a second



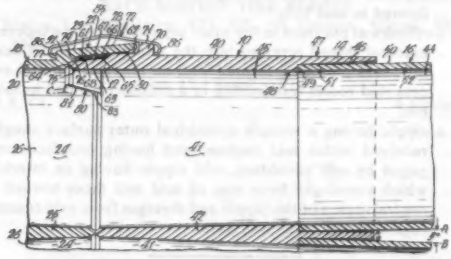
rigid conduit section secured intermediate its ends to the distal end of said arm normal thereto, said conduit sections having adjacently disposed inner ends and remotely disposed outer ends, and a flexible hose extending between and having its ends coupled to said inner ends of the conduit sections, and supported thereby for swinging movement with the arm across the pivotal connection of the arm second leg.

4,002,358

ADAPTER FOR CONNECTING CONDUIT TO PIPE

Kenneth F. Streit, Mt. Prospect, Ill., assignor to Phone-Ducs, Inc., Ill.

Filed Jan. 27, 1975, Ser. No. 544,496
Int. Cl.² F16L *39/00*
U.S. Cl. 285—137 R **13 Claims**



1. A light-weight, integral plastic adapter for connecting a unitary multiple duct conduit section to a plurality of individual single bore cylindrically shaped pipes comprising: a generally rectangularly shaped sidewall defining a passage therein; means at one end of said sidewall for connecting said adapter to an end of a multiple duct conduit section; partition walls integral with and extending transversely between said sidewall for dividing said passageway into a plurality of individual passages which are generally rectangular shaped in cross-section at one end of said adapter, said partition walls extending from said one adapter end and terminating at a location spaced inwardly from a second opposite end of the adapter, said partition walls tapering generally uniformly to produce an increasing wall cross-sectional thickness from said one adapter end to said location so that each of said passages are generally circular in cross-section at said location and smaller in cross-sectional area at said location than at said one adapter end; and further wall means integral with said sidewall and said partition walls and extending from said second adapter end to said location, said further wall means providing a plurality of cylindrical sleeves each aligned with one of said

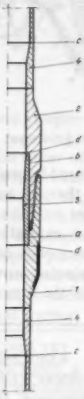
passages, each of said sleeves being adapted to be connected to one of said individual single bore pipes to provide a smooth transition between the rectangularly shaped end of said passages and said pipes.

4,002,359

TOOL JOINT FOR DRILL PIPES

Ion Lari, Cimpina, Romania, assignor to Institutul de Cercetari si Proiectari de Petrol si Gaze, Cimpina, Romania

Filed Oct. 29, 1975, Ser. No. 626,870
Claims priority, application Romania, Aug. 16, 1974, 79803
Int. Cl.² F16L *25/00*
U.S. Cl. 285—331 **1 Claim**



1. A joint for a pair of pipes of a drill string, comprising:
a cylindrical box fixed to one of said pipes and formed with an internal tapered thread and with a cylindrical recess beyond said thread said recess terminating in a shoulder formed in said box;
a cylindrical pin fixed to the other pipe and having a tapered external thread screwed into the internal thread of said box, said pin being formed with an inner cylindrical recess said recess terminating in a shoulder formed in said pin;
a nipple having a smooth cylindrical outer surface snugly received within said recesses and having end faces engaged by said shoulders, said nipple having an interior which converges from one of said end faces toward a central region of the nipple and diverges from said central region to said other end face.

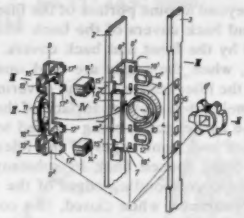
4,002,360

WINDOW HARDWARE

Gerhard Frank, and Ernst Roth, both of Wilnsdorf-Obersdorf, Germany, assignors to Siegenia-Frank KG, Siegen, Germany

Filed Sept. 6, 1974, Ser. No. 503,975
Claims priority, application Germany, Sept. 8, 1973, 2345496
Int. Cl.² E05B *9/00*, *9/06*; E05C *1/06*, *1/12*
U.S. Cl. 292—336.3 **6 Claims**

1. Window hardware, comprising
a. a housing consisting of two interconnected of two interconnected parts forming a guide channel, one of the said parts of the housing having a generally U-shaped cross-section and the other part of the housing having an L-shaped cross-section,
b. a track on which the housing is fastened,
c. a pinion supported in the housing, and
d. a drive rod slidably carried in the guide channel of the housing for driving engagement with the pinion, the two said parts of the housing being of different cross-sectional heights and being also mountable together, so that first legs are positioned parallel to and adjacent to the track to form a guide channel for the drive rod, while secondary



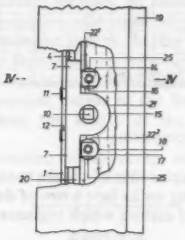
legs are positioned at right angles to the plane of the track and parallel to each other to act as supports for the pinion which is located in both parts of the housing.

4,002,361

WINDOW FASTENER

Willy Laufenburg, BRD, Torwiesenweg 20, Wilnsdorf-Niederielfen, Germany

Continuation of Ser. No. 433,101, Jan. 14, 1974. This application May 9, 1975, Ser. No. 575,950
Claims priority, application Germany, Jan. 23, 1973, 2303114
Int. Cl.² E05B *3/00*, *9/00*, *9/08*
U.S. Cl. 292—336.3 **13 Claims**



1. A locking arrangement for use on the frames of doors and windows, the frame having a planar side face and a planar edge face substantially perpendicular to said side face, comprising
a. a recess formed in the frame, said recess being formed of a combination of
i. a groove of uniform depth formed in the edge face, and having a floor spaced from and parallel to the edge face,
ii. a main hole having a first cylindrical peripheral surface formed in the frame through the side face and spaced from the edge face, the axis of the main hole being parallel to the edge face with the first surface intersecting the groove floor,
iii. two side holes each having a second cylindrical peripheral surface formed in the frame and opening onto the side face, each side hole being spaced from the edge, the axis of the side hole being outside of the main hole and parallel to the edge face with the second surface intersecting the groove floor, each side hole being substantially separated from the main hole so that a bridge of frame material lies between them,
b. a locking device which allows a rotation of a handle to cause locking action, comprising
i. a drive housing including an elongated base part having a side and mounted in the groove, a pinion housing

extending from the side and into the main hole, and an extension extending from the side spaced from the drive housing and extending into the side hole,

ii. a pinion mounted in the pinion housing for engagement by the handle, and

iii. a push member mounted in the base part for engagement with the pinion for effecting the locking action.

4,002,362

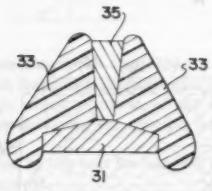
BUMPER CUSHION RUB STRIP

Henry Eldon Sears, North Kitchener; John Charles Prast, Kitchener; Raymond Wiefred McNally, Kitchener; Calvin C. Lee, Kitchener, and William F. McAvey, Waterloo, all of Canada, assignors to B. F. Goodrich Canada Limited, Canada

Continuation of Ser. No. 406,484, Oct. 15, 1973, abandoned. This application July 1, 1975, Ser. No. 592,345

Int. Cl.² B60R *19/08*

U.S. Cl. 293—62 2 Claims



1. A rub strip structure for automotive use comprising a composite plastic strip formed by a continuous extrusion process, the composite plastic strip being made up of a hard resilient plastic base member, constituting an integral part of said strip, the hard resilient plastic base member having a relatively flat bottom surface and a slightly arched upper surface with a thickness which is relatively small compared to the width of said bottom surface; and a yieldable cushion member of generally trapezoidal cross sectional shape, having its largest width adjacent said base member and adapted to surround the top surface and side surfaces of said base member and permanently bonded to said base member, and fastening means supported solely by said base member, said fastening means extending into an opening in said base member and being gripped by the inner walls of said opening within the bottom surface of said base member so as to be held in engagement with said base member.

2. A rub strip structure for automotive use comprising a composite plastic strip, the composite plastic strip being made up of a hard resilient platic base member constituting an integral part of said strip; the hard resilient plastic base member having a relatively flat bottom surface and a slightly arched upper surface with a thickness which is relatively small compared to the width of said bottom surface; and a yieldble cushion member of generally trapezoidal cross sectional shape, having its largest width adjacent said base member and adapted to surround the top surface and side surfaces of said base member and permanently bonded to said base member; said yieldable cushion member consisting of three portions integrally attached together in the form of two longitudinal side members and an intermediate wedge-like member between said two side members.

4,002,363

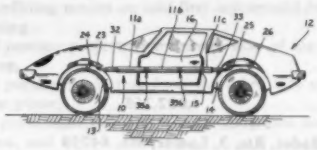
AUTOMOTIVE BODY PROTECTIVE APPARATUS

John R. James, 6334-A Crestline Terrace, Norcross, Ga. 30071

Filed Sept. 12, 1975, Ser. No. 612,940

Int. Cl.² B60R *13/04*

U.S. Cl. 293—62 10 Claims



1. Protective apparatus for removable attachment to an exterior portion of an automotive vehicle or the like, comprising:

a plurality of separate elongate members each having a mar-resistant surface for contact with the side of a vehicle or the like, and having an outer protion which is spaced apart from said mar-resistant surface;

resilient means connecting together confronting ends of said separate elongate members to selectively provide an extended configuration wherein said separate elongate members extend in substantially linear end-to-end alignment for disposition alongside the vehicle, and a folded configuration wherein said resilient means is yieldingly deformed to permit said separate elongate members to be folded back alongside one another; and

means disposed at the nonconfronting ends of said elongate members, which form the free ends of said extended configuration, to removably attach said protective apparatus in said extended configuration to a side of the vehicle

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4,002,364

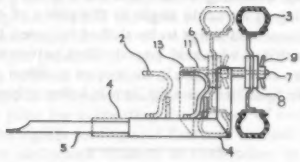
BACK MOTION TIRE BUFFER

Cheston Lee Eshelman, 621 NE. 30 Terrace, Miami, Fla. 33137

Filed Nov. 13, 1975, Ser. No. 631,630

Int. Cl.² B60R *19/10*

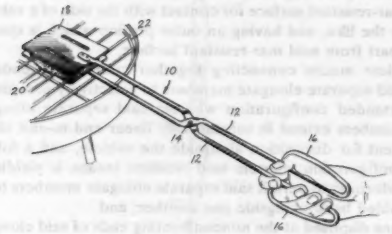
U.S. Cl. 293—67 6 Claims



1. In a motor vehicle, an energy absorbing backmotion tire buffer, comprising, in combination, a wheel mounted pneumatic tire postioned substantially vertical, with a circumference parallel to the lateral plane of the vehicle, forward of the vechicle movable bumper rail, so as to extend forward of other vehicle elements with the bottom of said tire and wheel being substantially level with the bottom of the vehicle bumper, and said tire and wheel being mounted on a carrier frame comprising a vertical arm element constructed and arranged at right angles to the longitudinal axis of the vehicle, at the top of said vertical arm element, a right angle attaching element facing forward from said vehicle for the purpose of attaching the hub of the wheel; at the bottom of said vertical arm element means for securing said vertical arm to the movable bumper of said vehicle comprising attaching flanges and a piston and a cylinder strut arrangement facing rearwardly of the vertical arm

element or a longitudinal plane of the vehicle, having the rear of said piston strut secured to said vehicle axle frame and the front of said cylinder strut secured to said vertical arm element and bumper, so as to allow limited back motion of the tire, wheel, vertical arm, cylinder strut, and vehicle bumper, as a unit when being forced back against stops in the cylinders without touching or denting the vehicle body, when striking an obstruction in front of the exposed tire and wheel.

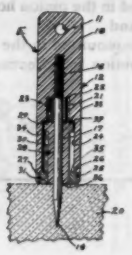
4,002,365
FOOD HANDLING TONGS
James A. Rader, Rte. 3, Lamar, Mo. 64759
Filed June 27, 1975, Ser. No. 591,130
Int. Cl.² A47J 43/28
U.S. Cl. 294—8 2 Claims



1. Tongs for handling a food item upon a grill, said tongs comprising a pair of arms each having first and second ends, said arms overlapping at a corresponding location between said first and second ends, means pivotally connecting said arms together at said corresponding location, said first arm ends being formed into cooperating handle means, a pair of plate members, one plate member connected to each arm at its second end, said tongs having a closed food item gripping position wherein said plate members spacedly overlie one another in a generally superimposed orientation and an open position wherein said plate members are laterally offset and further spaced apart, said handle means for pivotally moving said arms about said pivot connecting means, said pivot connecting means including means for shifting said arms in a plane extending at an acute angle to the plane of each plate member to cause said tongs to be shifted between their open and closed positions with said lateral offset between the plate members when said tongs are in their open position permitting viewing of the food item as said item is being gripped.

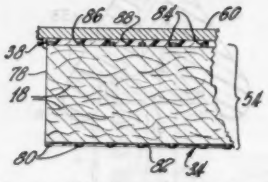
4,002,366
ACCESSORY SERVING AS LIFE SAVING AID
Robert B. Hammes, 132 Knollcrest Drive, Burlington, Wis. 53015
Filed Nov. 28, 1975, Ser. No. 636,218
Int. Cl.² F25C 5/16
U.S. Cl. 294—26 7 Claims

1. An ice piercing device comprising a substantially vertically directed outer casing forming a hand gripping handle; a pick having its upper end secure with the casing and internally thereof; said casing having a first bore therein; a second bore diametrically greater than the first bore; a pick guard positioned in the second bore for reciprocation therein; said guard having a passage extending therethrough and being reciprocably mounted on the pick; a shoulder formed on the casing at the upper end of the first bore; a spring encircling the pick and interposed between the shoulder and the guard for normally urging the guard downwardly; means within the casing for



limiting the downward travel of the guard; said pick having an ice piercing pointed nose at its lower end.

4,002,367
INSULATION FOR A VEHICLE ROOF
William R. Thomas, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Division of Ser. No. 228,782, Feb. 14, 1972. This application Mar. 18, 1974, Ser. No. 452,034
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² B60J 7/00
U.S. Cl. 296—137 A 5 Claims



1. In combination, a vehicle roof panel, adhesive extending over a substantial portion of a lower surface of said roof panel, a compressible, flexible layer of glass fibers held together by a binder, said layer being of substantially uniform thickness and having a shape at least in part corresponding to at least part of the shape of said roof panel, an upper, non-woven, porous fabric adhered to the upper surface of said layer, with a portion of said adhesive extending through interstices in said porous fabric and into contact with fibers of said layer to adhere said layer to the lower surface of said panel with said porous fabric serving as a net-like reinforcement in the adhesive, a lower, cloth-like, non-woven fabric adhered to the lower surface of said layer by the same binder which holds the glass fibers together, said lower, non-woven fabric extending substantially over the entire surface of said layer and also having a shape at least in part corresponding to at least part of the shape of said roof panel, and a headliner separate from said lower, non-woven fabric and located therebelow and covering substantially all of said lower, non-woven fabric.

4,002,368
HANGING CHAIR
Eileen S. Ortize, P.O. Box 585, Pawleys Island, S.C. 29585
Filed Jan. 9, 1976, Ser. No. 648,106
Int. Cl.² A47D 13/10
U.S. Cl. 297—273 8 Claims

1. A chair for hanging from an overhead support, which chair comprises:

a. a flexible seat having a substantially trapezoidal configu-

ration formed substantially of loosely woven material which permits the seat to expand in all directions wherein:

1. the shorter parallel side forms the back portion of the chair;
2. the longer parallel side forms the front portion of the chair; and
3. the two non-parallel sides form the side portions of the chair;

b. a rigid frame member carried by each side portion, wherein each frame member includes a plurality of aperture through which portions of the seat material are passed for maintaining the side portions in a stretched condition; and

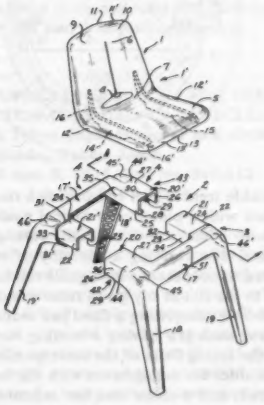
c. means carried by the seat for hanging the chair from the overhead support.

4,002,369

CHAIR AND METHOD OF MAKING SAME

Roy E. Jennings, Temple, Tex., assignor to Royal Seating Corporation, Cameron, Tex.

Continuation of Ser. No. 198,175, Nov. 12, 1972, abandoned.
This application Mar. 17, 1972, Ser. No. 235,673
The portion of the term of this patent subsequent to Oct. 11, 1992, has been disclaimed.
Int. Cl.[2] A47C *3/04, 3/20, 5/12*
U.S. Cl. 297—445 **10 Claims**



1. A chair base structure comprising, in combination

a first unitary plastic material base piece having a pair of spaced apart legs;

a second unitary plastic material base piece having a pair of spaced apart legs;

interfitting means on said first and second base pieces to facilitate assembling said pieces to provide a base having four legs and in which two of the legs diverge relative to the other two legs;

said interfitting means on said first and second base pieces including

a rail portion projecting from one side of the first base piece,

a rail portion projecting from the other side of the first base piece,

a rail portion projecting from one side of the second base piece, and

a rail portion projecting from the other side of the second base piece;

said rail portions including two female rail portions and two male rail portions;

each male rail portion comprising

an upright outside wall,

an upright inside wall spaced from the outside wall, and

a top wall integrally joining said inside and outside walls;

each of said female rail portions comprising

an outside wall,

an inside wall spaced from the outside wall,

a top wall integrally joining said inside and outside walls, and

wall means extending from the lower edge of said inside wall toward said outside wall, and from the lower edge of said outside wall toward said inside wall;

said male portions being slidably receivable respectively in said female portions, and said wall means engaging bottom edges of said inner and outer walls of the male rail portions to provide beam strength for the rails;

means securing the respective male and female rail portions together;

each of the four legs of the base including

a first rigid upright side wall,

a second rigid upright side wall integral with and extending at an angle to the first wall;

said walls of the legs being devoid of frangible sections;

a multiplicity of strengthening means for each leg, said strengthening means comprising a multiplicity of rigid webs in spaced apart generally parallel relation to each other along the length of each leg,

each of said webs extending transversely between and being integral with said first and second upright walls of a leg, and each of the webs presenting a bottom surface which faces downwardly when the base is in its normal upright position, so that the legs can be severed along the bottoms of selected coplanar webs to provide a base of the desired height with an integral floor engaging glide for supporting the bottom of each leg;

said webs rigidly joining said first and second upright walls against deflection relative to each other to rigidify and strengthen the leg, the bottom web of a leg providing a floor engaging glide, and webs above said bottom web providing strength and rigidity for the leg.

6. A chair base structure comprising, in combination

a first unitary plastic material base piece having a pair of spaced apart legs;

a second unitary plastic material base piece having a pair of spaced apart legs;

means for joining said base pieces to provide a base having four legs and in which two of the legs diverge relative to the other two legs;

said first and second base pieces including

a rail portion projecting from one side of the first base piece,

a rail portion projecting from the other side of the first base piece,

a rail portion projecting from one side of the second base piece, and

a rail portion projecting from the other side of the second base piece;

each of the rail portions including

a horizontal wall, and

upright side walls projecting in the same direction from the horizontal wall;

said base pieces being oriented with said legs extending downwardly and with said rail portions of the respective base pieces in facing, aligned, adjacent relation with each other so the rail portions at one side of the aligned base pieces form a first rail and the rail portions at the other side of the aligned base pieces form a second rail;

said means for joining said base pieces including first and second connectors joining the rail portions of the respective first and second rails, each connector comprising

a horizontal wall, and

upright sidewalls projecting in the same direction from the horizontal wall;

the walls of the first connector engaging the horizontal and upright walls of the rail portions of the first rail, and the walls of the second connector engaging the horizontal and upright walls of the rail portions of the second rail, said connectors being of a size to be a close sliding fit with respect to the rail portions; at each rail, one of the joining connector and rail having inwardly projecting wall means extending across and engaging generally horizontal edges of the upright walls of the other of the joining connector and rail to add beam strength to the connected rails;

means securing the first connector to each rail portion of the first rail;

means securing the second connector to each rail portion of the second rail;

each of the four legs of the base including

a first rigid upright side wall,

a second rigid upright side wall integral with and extending at an angle to the first wall;

said walls of the legs being devoid of frangible sections;

a multiplicity of strengthening means for each leg, said strengthening means comprising a multiplicity of rigid webs in spaced apart generally parallel relation to each other along the length of each leg,

each of said webs extending transversely between and being integral with said first and second upright walls of a leg, and each of the webs presenting a bottom surface which faces downwardly when the base is in its normal upright position, so that

the legs can be severed along the bottoms of selected coplanar webs to provide a base of the desired height with an integral floor engaging glide for supporting the bottom of each leg;

said webs rigidly joining said first and second upright walls against deflection relative to each other to rigidify and strengthen the leg, the bottom web of a leg providing a floor engaging glide, and webs above said bottom web providing strength and rigidity for the leg.

4,002,370

VALVE ASSEMBLY FOR EXHAUST SYSTEM

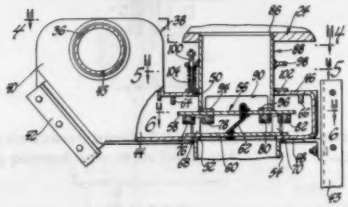
Donald F. Blackmore, Wadsworth, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 11, 1976, Ser. No. 665,801

Int. Cl.² B60P *1/00*

U.S. Cl. 298—1 H **3 Claims**

1. A valve assembly for a vehicle having a chassis supporting an operator's cab and a pivoted material-handling container having a hollow body structure, the valve assembly adapted to direct exhaust gases upwardly into said hollow body structure when the material-handling container is in a lowered load-retaining position and adapted to direct the exhaust gases downwardly toward the ground when the material-handling container is in a raised dumping position, said valve assembly comprising a housing having a first outlet opening and a second outlet opening formed therein, a closure member comprising spaced upper and lower plate members, a flexible member interconnecting said plate members, said closure member adapted to move between a first position wherein said upper plate member closes the first outlet opening and said lower plate member opens the second outlet opening and a second position wherein said lower plate member closes the second outlet opening and said upper plate member opens the first outlet opening, first and second holding means, said first holding means serving to maintain said closure member in said first position when the material-handling container is in the



raised dumping position, a conduit secured to and projecting downwardly from said material-handling container and communicating with said hollow body structure, said conduit extending into said first outlet opening when the material-handling container is in the lowered load-retaining position so as to directly contact the upper plate member and cause the latter to be moved into the second position against the influence of the first holding means while the second holding means causes the upper plate member to be held by the conduit.

4,002,371

VARIABLE TRACK VEHICLE WHEEL

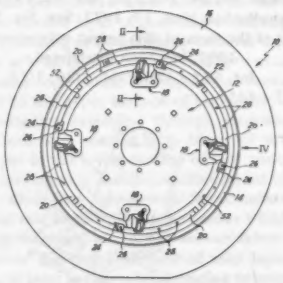
Jean-Claude Bonne, Eaubonne, France, assignor to Acieries de Gennevilliers Anciens Ets. C. Delachaux, Gennevilliers, France

Filed Apr. 21, 1975, Ser. No. 569,774

Claims priority, application France, Apr. 29, 1974, 74.14817

Int. Cl.² B60B *23/12*

U.S. Cl. 301—9 TV **5 Claims**



1. Adjustable tread wheel comprising a rim provided on its inner surface with a plurality of helical guide rails, each rail having a pair of flanks and an axially extending bearing surface, a wheel disc carrying a plurality of clamping devices each adapted to cooperate with a guide rail for connecting the wheel disc to the rim in any given relative axial position, each clamping device comprising a fixed jaw secured to the disc, a movable jaw, each jaw having a bearing surface for engagement with the facing flank of the corresponding guide rail and a radial shoulder for engagement with the bearing surface of the guide rail, and a screw and nut assembly extending in a hole provided in each jaw, for urging the movable jaw towards the fixed jaw to clamp the guide rail therebetween, the axis of

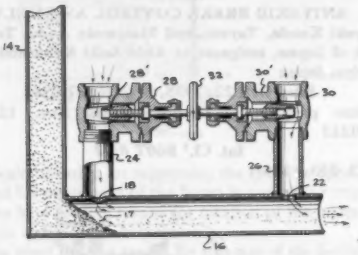
the screw being inclined with respect to the bearing surface of the guide rail so that the tightening of the screw and nut assembly results in a relative outward radial displacement of the movable jaw and the rail engaged thereby.

4,002,372

PULVERULENT MATERIAL METERING AND DELIVERY SYSTEM AND METHOD

Joseph Franklin Edwards; Johnny Milton Brown; James Vernon Christian, all of Kingsport, and Clayton Elkins, Jonesboro, all of Tenn., assignors to General Shale Products Corporation, Kingsport, Tenn.

Filed Dec. 1, 1975, Ser. No. 636,649
Int. Cl.² 222 *193;* **B65G** *53/16*
U.S. Cl. 302—25 **9 Claims**



1. A solid fuel metering and delivery system for feeding particulate fuel to a combustion chamber comprising a source of finely ground solid fuel particles, conduit means extending between said source of finely ground solid fuel particles and said combustion chamber, said source of fuel particles including a feed pipe having a vertical component of axial orientation and upper and lower ends, a metering conduit having a horizontal component of orientation and an upstream end and a downstream end, said upstream end of said metering conduit being connected to the lower end of said feed pipe, the lower end of said feed pipe being full of finely ground solid fuel particles which flow outwardly into said metering conduit to provide a surface of repose of said finely grould fuel in said metering conduit, an air inflow opening in said metering conduit positioned over said surface of repose, means connected to said metering conduit at said downstream end for creating a pressure drop in said metering conduit between said air inflow opening and said downstream end so that air flows into said air inflow opening to engage said surface of repose to entrain fuel particles therefrom and convey said entrained fuel particles to said downstream end of said metering conduit for effecting the discharge of air and solid fuel particles from said downstream end into said combustion chamber.

4,002,373

BRAKE OPERATING SYSTEM FOR USE IN ELECTRICALLY DRIVEN VEHICLES

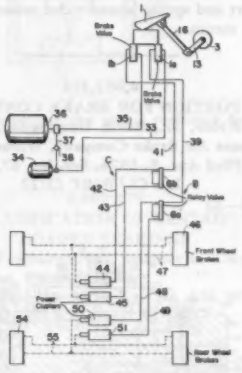
Katsuyoshi Mori, Tokyo, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Apr. 8, 1975, Ser. No. 566,612
Int. Cl.³ B60T *13/74*
U.S. Cl. 303—3 **2 Claims**

1. In a brake operating system for use in an electrically driven vehicle said system including an electric brake system, pneumatically operated fron and rear wheel brake systems, a first fluid supply source coupled to said front wheel brake system and a second fluid supply source coupled to said rear wheel brake system, a pair of treadle type brake valves, each being pneumtically connected to one of said fluid supply sources, a brake pedal connected to said pair of brake valves and operating means for independently operating said electric and pneumatically operated brake systems, the improvement wherein said operating means comprises:

a. pneumatic operating means for operating said pneumatically operated brake system, said pneumatic operating means having a pair of independent penumatic circuits, one of said circuits being connected between on of said brake valves and said front wheel brake system and the other circuit being connected between the other brake valve and said rear wheel brake system; and

b. mechanical operating means including a linking means for operating said electric brake system said linking



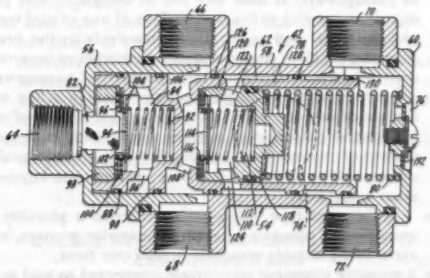
means being directly connected to said brake pedal independent of said pneumatic operating means and having a rheostat for controlling the field of an electric motor driving said vehicle and a mechanism for mechanically operating said rheostat said linking means being connected between said brake pedal and said rheostat, wherein upon depression of said brake pedal said electric brake and pneumatically operated brake systems are respectively operated through their respective operating means independently of each other.

4,002,374

TRAILER AIR DISTRIBUTION VALVE

Charles Horowitz, Niles, Ill., assignor to Sloan Valve Company, Franklin Park, Ill.

Filed May 7, 1975, Ser. No. 575,468
Int. Cl.² B60T *15/48, 17/04*
U.S. Cl. 303—29 **15 Claims**



1. In a trailer air distribution valve, a housing, a chamber in said housing, said housing having an air inlet port, an exhaust port, at least one service tank port, an emergency tank port and at least one brake chamber port, all opening into said chamber, and a shuttle movable in said chamber to control air pressure flow between said ports,

spring means biasing said shuttle to a position connecting said brake chamber port and exhaust port and closing

communication between said inlet port and said service tank and emergency tank ports, air pressure at said inlet causing said shuttle to move to a position closing communication between said brake chamber port and exhaust port,

passage means carried by said shuttle between said inlet port and said service tank port and spring biased valve means carried by said shuttle for closing said passage means between said inlet port and said service tank port,

passage means for connecting said emergency tank port and inlet port and spring biased valve means for closing said passage means.

4,002,375

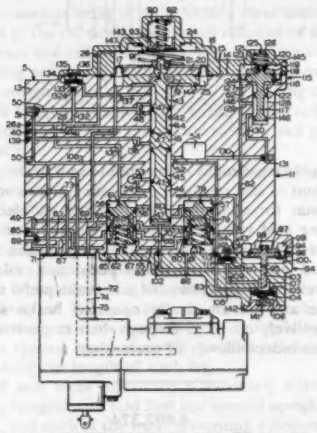
SERVICE PORTION FOR BRAKE CONTROL VALVES

Charles L. Weber, Jr., North Huntingdon, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Apr. 5, 1976, Ser. No. 673,730

Int. Cl.² B60T *15/22*

U.S. Cl. 303—33 10 Claims



1. For use in a brake apparatus including a brake pipe, an auxiliary reservoir and an emergency reservoir each normally charged to a certain chosen pressure and a brake cylinder, a fluid-pressure-operated triple valve device comprising;

a. a casing having therein a plurality of bores and a plurality of passageways, at least one end of certain of said passageways opening at the wall surface of one of said bores and the other end connected respectively to the brake pipe, the auxiliary reservoir and the emergency reservoir, one end of a first pair of said plurality of passageways other than said certain passageways opening at the wall surface of said one bore and the other end of each of said first pair of passageways opening respectively at the wall surface of one and the other of a first pair of said plurality of bores other than said one bore, wherein the improvement comprises:

b. a main spool-type valve having thereon a plurality of spaced-apart elongated peripheral annular grooves, said valve being slidably mounted in said one bore,

c. a movable abutment operatively connected to said main spool-type valve and subject on its respective opposite sides to the pressure in the brake pipe and in the auxiliary reservoir, the deflection of said abutment responsive to the pressure on either side thereof exceeding that on the other side being effective to cause shifting of said main valve in said one bore,

d. a spool-type piston valve having thereon a plurality of spaced-apart elongated peripheral annular grooves slidably mounted in each of said pair of bores, and

e. means for biasing the piston valve in each one of said pair of bores to one of two positions whereby, while the piston valve in each of said pair of bores occupies its said one position, the brake cylinder is open to atmosphere, one of said piston valves being shiftable to the other of its two positions to cut off the brake cylinder from atmosphere upon the supply of fluid under pressure thereto responsive to shifting of said main valve to one position in said one bore, and the other of said piston valves being shiftable to the other of its two positions to establish a communication between the auxiliary reservoir and the brake cylinder upon the supply of fluid under pressure thereto responsive to shifting of said main valve to another position in said one bore.

4,002,376

ANTI-SKID BRAKE CONTROL ASSEMBLY

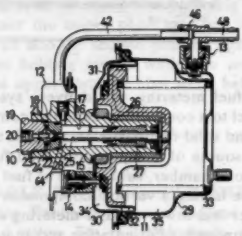
Toshiyuki Kondo, Toyota, and Masamoto Ando, Toyohashi, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Oct. 22, 1975, Ser. No. 624,582

Claims priority, application Japan, Nov. 12, 1974, 49-130223

Int. Cl.² B60T *8/02*

U.S. Cl. 303—115 3 Claims



1. An anti-skid brake control assembly for a vehicle comprising:

a hydraulic controller including an inlet port connected to a master cylinder generating hydraulic pressure, an outlet port connected to at least one wheel cylinder of a wheel, cut off valve means disposed between said inlet and outlet ports for selectively blocking the communication therebetween, a pressure chamber disposed between said cut off valve means and said outlet port, and plunger means slidably disposed within said pressure chamber for varying the volume of said pressure chamber, said plunger means being operatively connected at one end thereof to said cut off valve means to thereby urge said cut off valve means to its open position when the volume of said pressure chamber is minimal;

servo means including a casing, diaphragm piston means dividing said casing into a first chamber and a second chamber, said diaphragm piston means being displaceable due to a pressure difference between said first and second chambers and being operatively connected to the other end of said plunger means, and biasing means disposed within said second chamber for normally urging said diaphragm piston and said plunger means in that direction in which said plunger means decreases the volume of said pressure chamber;

valve means for communicating said first chamber with a low pressure source through conduit means when the normal braking action is applied, and for communicating said first chamber with a high pressure source when the wheel is locked in or about to be locked;

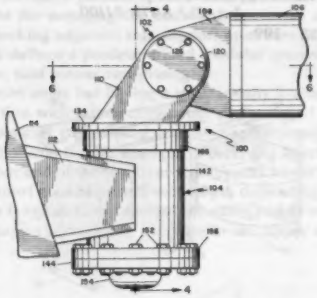
restricting means communicating said conduit means with said second chamber; and

one way valve means permitting unrestricted free flow from said second chamber to said conduit means.

4,002,377
SEALED BEARING FOR LOAD CARRYING BOOMS

Sverre Jangaard, Alpine, Calif., assignor to Campbell Industries, San Diego, Calif.

Filed July 31, 1975, Ser. No. 600,268
Int. Cl.² F16C 1/24
U.S. Cl. 308—36.1 7 Claims



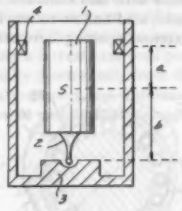
1. A sealed bearing for supporting the end of a boom carrying a load for movement of the boom in two axes comprising:
- a boom heel bearing means for rotation of the boom about a first axis,
- a boom pivot bearing means for rotation of the boom about a second orthogonally related axis,
- said boom pivot bearing means and boom heel bearing means being structurally interconnected,
- said boom heel bearing means comprising a sealed bearing enclosure,
- a boom heel pin in said sealed bearing enclosure for relative rotational support between said boom and said boom pivot bearing.
- said pivot bearing means comprising a sealed cylindrical bearing enclosure having a generally planar end plate and a bearing post in said sealed cylindrical bearing enclosure.
- said bearing post having a sliding bearing relationship with said end plate and with the walls of said sealed cylindrical bearing enclosure,
- said pivot bearing incorporating a top plate which overlies the upper edges of said sealed cylindrical bearing enclosure,
- said bearing post comprising a cylindrical member having an open central chamber and a bottom plate,
- said bottom plate being in bearing relationship with said end plate through a bearing insert.

4,002,378
VERTICALLY SUPPORTED ROTARY BODY

Peter Meinke, Grobinzemoos, Germany, assignor to Maschinenfabrik Augsburg-Nurnberg AG, Munich, Germany

Filed Jan. 20, 1975, Ser. No. 542,154
Claims priority, application Germany, Jan. 24, 1974, 2403293
Int. Cl.² F16C 13/06, 15/00, 17/08, 19/12
U.S. Cl. 308—147 4 Claims

1. A rotational arrangement comprising a rotary body, support means resiliently supporting said rotary body at least at one of its ends, and a rigid extension means between the end of said rotary body and said support means for reducing the radial forces produced on said support means during rotation of said body, said extension means being rotatable with said rotary body and having a substantially smaller diameter than said rotary body, the mass per unit axial length of said extension means being less than the mass per unit axial length of said rotary body, so as to minimize any displacement of the center of gravity of said combined rotary body and extension means as compared to the center of gravity of said rotary body alone, said extension means having its only support at said

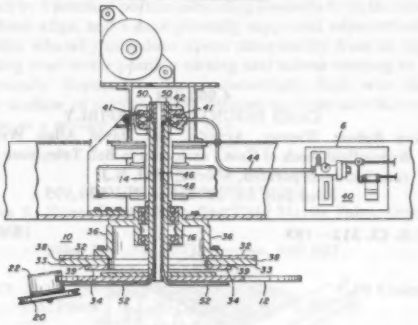


support means, whereby the radial restoring forces on said support means is reduced.

4,002,379
OIL MIST LUBRICATION OF CENTRIFUGALLY LOADED BEARINGS

Guy E. Martin, Pittsburgh, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Nov. 10, 1975, Ser. No. 630,357
Int. Cl.² F16C 33/30
U.S. Cl. 308—187 4 Claims



1. In combination,
- a substantially planar supporting member adapted to be rotated about an axis extending generally perpendicular to the plane of the member, and at relatively high rotational speeds,
- at least one bearing unit supported on and adjacent the periphery of said member, such that the bearing unit is eccentrically located with respect to the axis of rotation of the supporting member, and is subjected to high centrifugal forces when the supporting member is rotated at high rotational speeds, and,
- means adapted to supply the bearing unit with an essentially weightless lubricating mist.

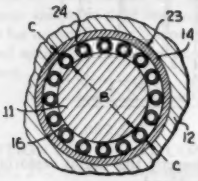
4,002,380
ROLLER BEARING OF SUPERIOR RUN-OUT CHARACTERISTICS

Willard L. Bowen, Harwinton, Conn., assignor to The Torrington Company, Torrington, Conn.

Continuation of Ser. No. 287,010, Sept. 7, 1972, Pat. No. 3,765,071, which is a continuation-in-part of Ser. No. 39,767, May 22, 1970. This application Aug. 7, 1973, Ser. No. 386,318
Int. Cl.² F16C 13/00
U.S. Cl. 308—207 R 19 Claims

1. A roller bearing of superior runout characteristics for the dimensional control of the components thereof in accordance with an acceptable standard of grading bearings and bearing

components wherein the quality of bearings and bearing components are graded in a predetermined sequence, said roller bearing comprising companion bearing races of known inferior grade in accordance with said standard, and hollow metal rollers of a known grade, said hollow rollers having a diameter greater than the maximum spacing between said races with



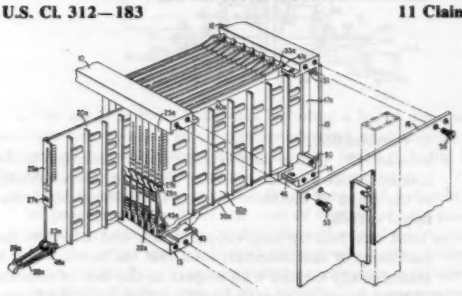
said rollers being in a preloaded condition between said races, and said bearing having the runout characteristics of a bearing of a grade in accordance with said standard superior to that required for a bearing utilizing races of said known inferior grade and solid rollers of said known grade without clearance between each roller and said races.

4,002,381

CARD MOUNTING ASSEMBLY

Guy Robert Wagner, Arvada, and David Allan Weisheit, Broomfield, both of Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 31, 1975, Ser. No. 600,595
Int. Cl.² A47B *63/00*
U.S. Cl. 312—183 **11 Claims**



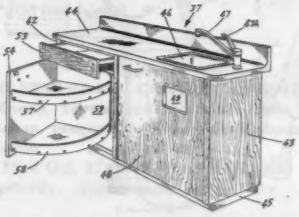
1. A component assembly comprising at least one component card, a frame for supporting said component card including a card receiving end member, a base end member, a guide member for slidably guiding said card between said card receiving end and base end members, a lever pivotally mounted on said card for engaging said guide member at said receiving end member, said lever being adapted to lock into a fixed position on said card when said card is in a home position against said card receiving end member, said guide member being fixedly attached to said base end member and slidably attached to said receiving end member, said guide member having an elastically elongatable section intermediate said receiving end member and base end member, said elastically elongatable section of said guide member being longitudinally elongated responsive to the pivoting of said lever towards said card, said guide member and said lever cooperating to urge said card against said base end member and to controllably restrain said card in said home position against said base end member.

4,002,382

CABINET STRUCTURE FOR DENTAL TREATMENT ROOM

Hugo M. Wolf, 1451 NE. Glacier Lane, Minneapolis, Minn. 55421, and Leo H. Wolf, 2000 Idaho Ave. South, Minneapolis, Minn. 55426

Division of Ser. No. 558,322, March 14, 1975, which is a division of Ser. No. 292,478, April 3, 1972, Pat. No. 3,902,246. This application July 24, 1975, Ser. No. 598,840
Int. Cl.² A47B *81/00*
U.S. Cl. 312—209 **7 Claims**



1. A cabinet for use in a dental treatment room comprising: a base support, a pair of upright wall means providing upright side panels mounted on the base support, a generally horizontal top mount on upper portions of the side panels, sink means mounted on the top, first upright door means located on a portion of the front of the cabinet, means pivotally mounting the first door means on one side panel for movement about a generally upright axis to selective open and closed positions, generally horizontal shelf means mounted on the inside of the first door means, second door means located on another portion of the front of the cabinet, and first means pivotally mounting the second door means on the other side panel for movement about a generally upright axis to selective open and closed positions, said second door means having an opening providing access to the interior of the cabinet, and container means attached to the inside of the second door means below the opening for receiving and storing objects moved through the opening, and a drawer located above the first door means and below the top, means movably mounting the drawer on the wall means for selective generally horizontal movement to an out open position and in closed position, and a drawer located above the first door means and below the top, means movably mounting the door on the wall means for selective generally horizontal movement to an out open position and in closed position.

4,002,383

MODULAR LABORATORY BENCH ASSEMBLY

Caswell Francis Holloway, Jr., Haverford, Pa., assignor to The Holloway Corporation, Haverford, Pa.

Filed Sept. 11, 1975, Ser. No. 612,532
Int. Cl.² A47F *5/08*; A47B *55/00*
U.S. Cl. 312—209 **31 Claims**

1. A modular laboratory bench assembly including a counter top and a floor mounted frame for supporting said counter top at a predetermined height above the floor, said frame comprising:

a. at least two rigid, preassembled side support members, each of which comprises:

i. a rear leg having an upper end with a pair of receiving apertures therein, a lower end and opposing side surfaces positioned to face adjacent side support members when assembled into a frame, said side surfaces having a plurality of apertures therein;

ii. a front vertical support bar having an upper end, with a pair of receiving apertures therein, and a lower end, said front vertical support bar being shorter than said rear leg;

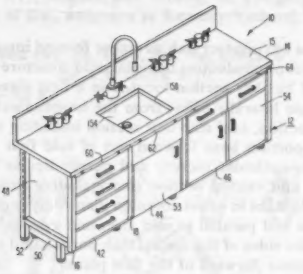
iii. an upper horizontal support bar rigidly connected between the upper ends of the front vertical support bar and the rear leg;

iv. a lower horizontal support bar rigidly connected between the lower end of the front vertical support bar and the rear leg; and

v. a front leg rigidly attached to the lower horizontal support bar and extending downwardly therefrom in substantially parallel spaced relation to the rear leg;

b. means for engaging the receiving apertures and rigidly interlocking adjacent side support members at a distance which defines a predetermined modular spacing therebetween, said means comprising:

i. a front angle bar having a substantially L-shaped cross-section with intersecting inner surfaces and a first pin depending from one of said inner surfaces adjacent one end of said bar for engaging a receiving aperture in the upper end of the front vertical support bar of a first side support member and a second pin depending from said one inner surface adjacent the other end of said bar for engaging a receiving aperture in the upper end of the



front vertical support bar of a second side support member adjacent said first side support member, the distance between said first and second pins being fixed such that said predetermined modular spacing is maintained between said adjacent side support members;

ii. a rear angle bar having a substantially L-shaped cross-section with intersecting inner surfaces and a first pin depending from one of said inner surfaces adjacent one end of said bar for engaging a receiving aperture in the upper end of the rear leg of the first side support member and a second pin depending from said one inner surface adjacent the other end of said bar for engaging a receiving aperture in the upper end of the rear leg of the adjacent side support member, the distance between the first and second pins being fixed such that said predetermined modular spacing is maintained between said adjacent side support members; and

iii. a rear spacer bar having hooks extending from each end thereof, said hooks being adapted for locking engagement in the facing side surfaces of adjacent side support members; and

c. means for levelling said frame.

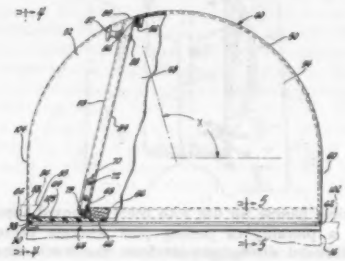
4,002,384

COMPACT REFRIGERATOR COMBINED WITH TOP STORAGE CONTAINER

Richard C. Brown, Dayton, Ohio, and Stuart B. Shuster, Birmingham, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sept. 4, 1975, Ser. No. 610,140
Int. Cl.² A47F *5/08*; A47B *47/00*
U.S. Cl. 312—284 **3 Claims**

1. A top storage container adapted to be removably retained on the top of a domestic refrigerator cabinet, said cabinet having a U-shaped trim strip positioned along the front and side edges of the refrigerator cabinet upper wall, said trim strip providing opposed trackways along the cabinet upper side edges to normally slidably receive a removed top wall panel, the improvement wherein said storage container including flange means on the underside thereof slidably received in the cabinet trackways, said container having half-round side walls joined by a concavo-convex top wall of single curvature including a lateral rear wall portion extending substantially tangentially downwardly from the rearward terminal end of said concavo-convex top wall, said container having a base wall coextensive with the cabinet upper wall, said conca-



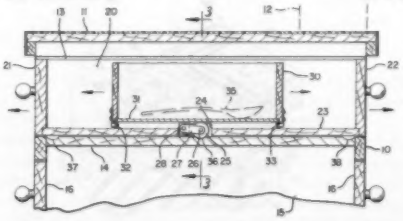
vo-convex top wall extending through a predetermined obtuse angle to define a front rearwardly and upwardly inclined access opening, said base wall having a transverse shoulder formed by a notched portion extending inwardly from the base wall front edge, and a door pivotally supported adjacent said shoulder whereby said door opens downwardly from an upstanding overcenter position closing said access opening to a horizontally disposed position substantially flush with the upper surface of said base wall forming an extension thereof for use as a service area or the like.

4,002,385

DOUBLE PULL DRAWER

Vernon R. Hone, Bridge Rte., Box 79A, Myrtle Point, Oreg. 97458

Filed Dec. 12, 1975, Ser. No. 640,007
Int. Cl.² A47B *81/00*
U.S. Cl. 312—286 **10 Claims**
U.S. Patent Jan. 11, 1977 4,002,385



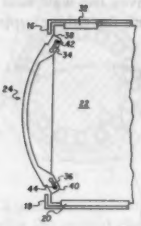
1. In a kitchen cabinet and the like having a drawer arranged to be pulled out from opposite sides of the cabinet, said drawer having bottom and side walls and having opposite end walls each equipped with a handle for pulling the drawer in said opposite directions, a receptacle in said drawer having a bottom wall, said receptacle being half the length of said drawer, and opening at mid length in the bottom of said drawer, a roller mounted on said drawer for rotation in said opening, and a supporting surface in said cabinet for the under side of said roller, said bottom wall of said receptacle resting on the upper side of said roller to shift said receptacle toward the outer end of said drawer when said drawer is pulled in either direction out of said cabinet, said receptacle being confined at all times within said drawer and said receptacle being at the outer end of said drawer when the drawer is pulled half way out of said cabinet.

4,002,386

LOCKING HANDLE APPARATUS

Robert W. McKenzie, Lewisville, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 28, 1975, Ser. No. 635,833
Int. Cl.² A47B *88/00*
U.S. Cl. 312—320 3 Claims



1. A flexible handle for use with track mounted apparatus containing a plurality of pulling pins wherein protection against accidental disengagement from the track mount is desirable comprising, in combination:

an elongated central flexible handle member consisting of acetal copolymer plastic material;

slot means at each extremity of said central member, said slot means comprising a deformable elongated restricted portion for restraining movement therethrough of the coacting pulling pins thereby creating a detect position, the handle member assuming a bowed condition when in a detented condition; and

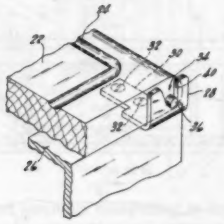
locking lip means on each extremity of said central member.

4,002,387

CABINET ARRANGEMENT FOR TRASH COMPACTORS

David W. Wolbrink, 42 Church St., Hartford, Wis. 53027

Filed Sept. 16, 1975, Ser. No. 613,924
Int. Cl.² A47B *91/00*, *51/00*; B30B *15/06*
U.S. Cl. 312—350 4 Claims



1. In a free standing trash compactor having a cabinet for containing a compacting mechanism and a receptacle in which compaction occurs, said cabinet having sidewalls and an upper end, the improvement comprising:

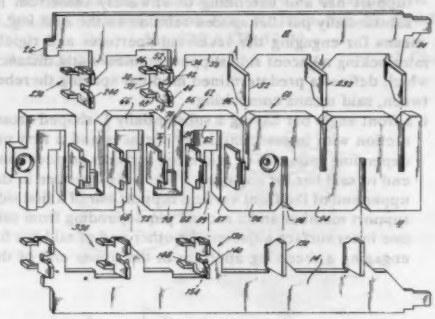
a reversible cutting board positionable on said cabinet upper end, said cutting board being hinged at one of its ends on said cabinet for upward pivotal movement by a hinge arrangment comprising a pair of brackets mounted adjacent the sidewalls of the cabinet, one of said brackets being contiguous with each of the sides of said cutting board adjacent said end for embracing said end of said cutting board, said brackets having upwardly facing notches formed for freely receiving pins extending from the center of the thickness of said cutting board at said embraced end by a downward movement of said board and restraining said pins at a pivot point during upward pivotal movement of said cutting board.

4,002,388

STAB ARRANGEMENT FOR BUSBARS

Gustavo A. Menocal, Delran, N.J., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Nov. 20, 1975, Ser. No. 633,622
Int. Cl.² H01R *13/04*; H02B *1/04*
U.S. Cl. 339—22 B 10 Claims



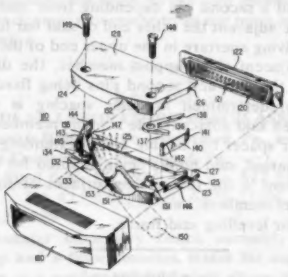
1. A bus bar contact stab structure formed integrally from a single sheet of conductive material, said structure including an elongated bus bar section located in a first plane and a stab unit section laterally offset from the longitudinal axis of said bus bar section, said stab unit section including a planar central stab portion bent forward out of said first plane into a plane perpendicular thereto and perpendicular to said axis, said stab unit central section also including first and second planar side stabs in a first common plane perpendicular to said first plane and parallel to said axis, said side stabs positioned on opposite sides of the central stab portion and extending the same distance forward of the first plane.

4,002,389

SELF LATCHING AND UNLATCHING CONNECTOR ASSEMBLY

Lewis Howard Mammel, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 11, 1975, Ser. No. 595,224
Int. Cl.² H01R *13/54*, *13/58*
U.S. Cl. 339—91 R 16 Claims



1. An electrical connector assembly including:

first and second connectors having mating electrical contacts, said first connector having affixed thereto a pair of barbed latch members; and

a connector mounting assembly, said connector mounting assembly including;

means for securing said second connector to said connector mounting assembly;

first and second leaf springs each having one end affixed to said connector mounting assembly;

means, integral with an opposite end of each of said leaf

springs, for latching said connector mounting assembly to said pair of barbed latch members upon engagement of said first and second connectors;

first and second pivotable levers, each lever having a pair of arms connected together at a predetermined angle; and

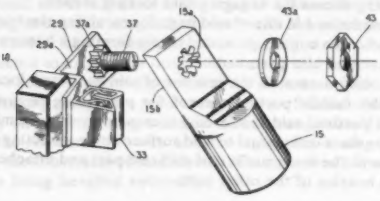
a sleeve assembly enclosing said connector mounting assembly, said sleeve assembly including first and second locking pins for engaging one arm of each of said levers as a disconnection force is applied to said sleeve assembly at any point on its periphery, the other arm of each of said levers engaging said first and second leaf springs at a point adjacent said latching means thereby deflecting said leaf spring latching means outwardly away from said pair of barbed latch members and releasing said connector mounting assembly from said first connector barbed latch members.

4,002,390

ARRANGEMENT FOR AND METHOD OF PREVENTING RELATIVE ROTATION OF ELECTRIC TERMINALS DURING A TIGHTENING OPERATION

William H. Perry, Atlanta, and William G. Morgan, III, Lilburn, both of Ga., assignors to Kearney-National, Inc., Atlanta, Ga.

Filed Oct. 28, 1975, Ser. No. 626,216
Int. Cl.² H01R 9/10
U.S. Cl. 339—95 R **7 Claims**



1. An arrangement for preventing relative rotation between cooperating electric terminals having flat face contacting contact surfaces and for securing said contact surfaces together, said arrangement comprising a threaded stud integral with one terminal and arranged to protrude from the contact surface thereof and disposed within a circular aperture formed in the other terminal, the contact surface of the other terminal being disposed generally normal to the axis of said stud, said stud having an enlarged circular base portion on the periphery of which serrations are formed and said aperture having complementary serrations formed in the circular walls thereof and selectively engageable with the serrations in said base portion to prevent relative rotation between said terminals in planes parallel to said contact surfaces, and fastening means threadedly related with said stud for securing said contact surfaces together.

4,002,391

INSULATION SLICING TERMINAL

Robert Brian Dunn, Ottawa, and John Davidson Lee, Manotick, both of Canada, assignors to Northern Electric Company Limited, Montreal, Canada

Filed Mar. 3, 1976, Ser. No. 663,260
Int. Cl.² H01R 13/38
U.S. Cl. 339—98 **7 Claims**

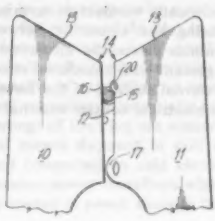
1. An insulation slicing terminal for insulated electrical conductors, said terminal of electrically conducting sheet material, comprising:

a base portion;

a pair of adjacent legs cantilevered from said base portion, said pair of legs including opposed side edges for reception of a conductor therebetween;

each of said legs further including a top edge, said top edges inclined towards each other in a shallow Vee formation, the top edge of each leg intersecting the related side edge at an abrupt angle to form insulation slicing edges;

a first swage on the side edge of one of said legs, said first swage positioned near the junction of said leg with said base portion and extending from the plane of the side edge to maintain a small gap between said opposed side edges;



a further swage on the side edge of one of said legs, said further swage at a position between said first swage and said shallow Vee formation;

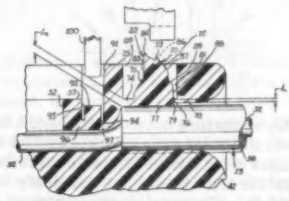
the arrangement such that on positioning an insulated connector in said Vee formation, the insulation is sliced from opposed sides of the conductor by said insulation slicing edges as the conductor is forced into said small gap between the opposed side edges and past said further swage, said further swage adapted to prevent movement of said conductor out of said terminal.

4,002,392

DEVICE ARMED WITH A TERMINAL FOR MAKING ELECTRICAL CONNECTION WITH A CONDUCTOR

Edwin Charles Hardesty, Perry Hall, Md., assignor to Western Electric Company, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 521,429, Nov. 6, 1974, Pat. No. 3,954,320, which is a continuation-in-part of Ser. No. 377,154, July 6, 1973, Pat. No. 3,860,316. This application Oct. 6, 1975, Ser. No. 620,630
Int. Cl.² H01R 13/38, 13/58
U.S. Cl. 339—99 R **21 Claims**



1. An electrical connector for terminating a cord having a plurality of insulated conductors and for making electrical contact external to the connector, which comprises:

an unipartite dielectric housing having one free end with internal surfaces of the housing defining a cavity that opens to the other end of the housing for receiving and substantially enclosing an end portion of a cord, with at least one portion of the housing adjacent the cavity being disposed in an initial position in a well and connected pivotally to the remainder of the housing toward the free end thereof, the pivotally connected portion having two intersecting externally facing surfaces, one of which has a stop formed thereon, the pivotally connected portion capable of being moved from the initial position to an actuated position at least partially into the cavity to clamp portions of the cord, and with a portion of the one exter-

nally facing surface of the pivotally moveable portion engaging an inwardly facing surface of the cavity of the remainder of the housing adjacent the cord-input end of the housing and the stop engaging a wall of the well adjacent the inwardly facing surface, the dual engagement of the one surface and of the stop with portions of the housing being effective to maintain the pivotally moveable portion in locked engagement with the cord during the application of retrograde forces to the cord; and

a plurality of electrically conductive terminals positioned within the housing and extending between the cavity where the terminals pierce the insulation of and make electrical engagement with associated conductors of the cord and an external surface of the housing where the terminals make electrical contact external to the connector.

4,002,393

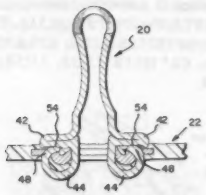
CONTACT MEANS FOR FLAT CONDUCTOR CABLE AND METHOD OF CONNECTING SAME

Roydon William Merry, Harrisburg, and James Lee Sherman, Bethel Park, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 529,767, Dec. 5, 1974, abandoned, which is a continuation of Ser. No. 333,579, Feb. 20, 1973, abandoned. This application Sept. 10, 1975, Ser. No. 612,160

Int. Cl.² H01R *11/20*

U.S. Cl. 339—97 C **4 Claims**



1. An assembly comprising contact means and a flat electrically conductive cable comprising a flat conductive layer, with said contact means being crimped to make electrical contact with said conductive layer in said flat electrically conductive cable, and in which said contact means comprises:

a contact portion;

a first backing member connected to and supporting said contact portion and having a first surface portion positioned upon a first section of a first side of said conductive layer and generally parallel to said first section; and

a first conductive leg integrally connected at one end to said first backing member with its other end extending through said conductive layer of said cable;

said other end of said first conductive leg being crimped in a curled configuration back upon itself and penetrating through said conductive layer and then extending towards the junction of said first conductive leg and said first backing member in a path adjacent to and generally parallel with the first surface portion of said first backing member, and exerting a force upon said first surface portion of said first backing member due to the tendency of the first conductive leg to relax.

4,002,394

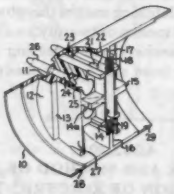
SINGLE LATCH SNAP-LOCK BASE FOR ANNULAR FLUORESCENT LAMPS

Dominic D. Cordiano, South Euclid; Joseph D. Kastelic, Euclid, and Vernon E. Thomas, Rocky River, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 10, 1975, Ser. No. 621,500

Int. Cl.² H01R *33/74*

U.S. Cl. 339—50 C **11 Claims**



1. A base for an annular lamp comprising:

a pair of parts having a semicylindrical external surface, said parts containing channels and legs having fitted cross sections formed on the interior thereof and spaced from said external surface;

at least one of said legs comprising locking means and at least the one of said channels receiving said one leg comprising means for engaging said locking means;

a recess formed in one of said parts for receiving electrically conductive contact pins, said recess forming a boss on the interior of said part; and

reinforcing means on the interior of said parts and located at the middle portion thereof for preventing flexure of said portion, said reinforcing means comprising semicircular discs orthogonal to said surface and connecting said boss to the inner surface of said one part and attached to the interior of the other part.

4,002,395

CONNECTOR

Robert Everett Wilson, Agoura, Calif., assignor to Viking Industries, Inc., Chatsworth, Calif.

Division of Ser. No. 531,924, Dec. 12, 1974, Pat. No. 3,958,853. This application Jan. 22, 1976, Ser. No. 651,615

Int. Cl.² H01R *13/38*

U.S. Cl. 339—99 R **2 Claims**

1. An insulation-penetrating contact element comprising:

a metal contact element having a wire-receiving slot, said slot having a slot portion which, as seen in an imaginary sectional view taken transverse to the length direction of an edge of the slot portion, forms a concave edge surface

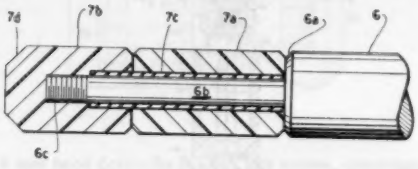
with a pair of corners that can readily press into the conductive core of an insulated wire.

4,002,396

ELECTRIC CONNECTOR APPARATUS

Robert E. Murdock, Atlanta, Ga., assignor to Kearney-National, Inc., Atlanta, Ga.

Filed Feb. 13, 1976, Ser. No. 657,856
Int. Cl.² H01R *13/52*
U.S. Cl. 339—111 **7 Claims**



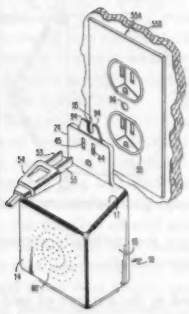
1. A contact pin constituting a component of an electric connector apparatus, said contact pin comprising a tubular conducting part of conducting material having a coaxial stem of conducting material projecting from the end of said tubular conducting part which is subjected to arcing, said stem being of substantially smaller diameter than said conducting part, a hollow tubular sleeve of brittle arc extinguishing material disposed about said stem and in coaxial relation therewith and having one end in snug engagement with the adjacent end of said tubular conducting part of conducting material which is subjected to arcing, the outer diameter of said hollow tubular sleeve being substantially equal to the diameter of said tubular conducting part, and a separate nose piece formed of mechanically strong insulating material and secured to said stem in coaxial relation therewith and having a part in engagement with the other end of said sleeve, the outer end of said nose piece being bevelled externally.

4,002,397

CONNECTOR FOR ELECTRIC PLUG

James P. Wang, and David I. Wolsk, both of Lexington, Ky., assignors to Wolsk Associates, Ltd., Lexington, Ky.

Filed Sept. 29, 1975, Ser. No. 617,706
Int. Cl.² H01R *3/00*
U.S. Cl. 339—147 R **12 Claims**



1. A connector for mounting on an electrical plug for disposition in an electrical receptacle without preventing prongs of the plug from being inserted sufficiently into the receptacle for connection to a source of power including:

a housing of an electrically insulating material;

said housing having a receptacle therein, said housing fully enclosing said receptacle;

said housing having a relatively thin portion extending from one side thereof and away from said receptacle;

said thin portion having at least two openings extending therethrough;

a pair of electrically conductive strips mounted within said thin portion, each of said electrically conductive strips having an opening therein with each of said openings aligned with the corresponding opening in said thin portion to enable one of the prongs of the plug to pass therethrough;

said openings in said electrically conductive strips being smaller than the prongs of the plug to grasp the prongs of the plug when the prongs are inserted therein;

each of said electrically conductive strips being formed of a material capable of expanding to receive the prongs of the plug and returning substantially to its original shape after the prongs of the plug are withdrawn therefrom;

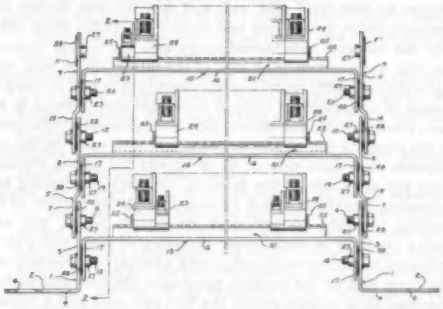
and electrical means disposed in said receptacle in said housing and connected to said electrically conductive strips to receive power therefrom when the plug is connected to a source of power through the electrical receptacle.

4,002,398

TERMINAL BLOCK RACK

Alfred H. Hanisch, Milwaukee, Wis., and Edward C. Fensholt, Overland Park, Kans., assignors to Allen-Bradley Company, Milwaukee, Wis.

Filed Mar. 17, 1975, Ser. No. 559,198
Int. Cl.² H01R *9/00;* **H02B** *1/04*
U.S. Cl. 339—198 GA **5 Claims**



1. In combination with an electrical control panel wherein electrical equipment is mounted, and wherein terminal blocks are positioned, the improvement which comprises:

a pair of longitudinally opposed supports mounted to said control panel and extending outwardly therefrom;

a pair of intermediary members, each being connected to one of said supports and being normally disposed substantially coplanar with said supports, but being selectively pivotal in either a clockwise or counterclockwise direction away from its normal position to assume a second position outside of the plane of said supports;

a mounting bridge having a pair of ends depending from a span longitudinally extending between said ends, each of said ends being pivotally connected to one of said intermediary members and said span having a plurality of terminal blocks mounted thereon;

the span of said mounting bridge being normally disposed substantially perpendicular to the plane of said intermediary members, but being selectively pivotal in either a clockwise or counterclockwise direction away from its normal position to assume a second position; and

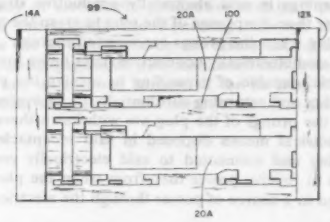
the span of said mounting bridge and said intermediary members being independently pivotal and capable of pivoting in opposite directions with respect to one another.

4,002,399

PRINTED CIRCUIT JACK

James C. Deitch, Bloomington, and Lawrence F. Leistiko, Minneapolis, both of Minn., assignors to Magnetic Controls Company, Minneapolis, Minn.

Filed Oct. 6, 1975, Ser. No. 619,594
Int. Cl.² H01R 13/50; H05K 1/04
U.S. Cl. 339—221 M 5 Claims



1. A molded dual jack especially suitable for direct connection on its bottom side to a printed circuit board comprising an elongated molded non-conducting housing having an elongate axis and first and second generally parallel end surfaces generally perpendicular to the elongate axis at opposite ends of the housing, said end surfaces connected together by elongated first, second and third side walls extending therebetween, parallel to the elongate axis, said end surfaces also connected together by an elongated intermediate side wall which is positioned between said first and second side walls, and perpendicular to said third side wall and said housing having two entrance holes in said first end surface to accept plugs along side the elongate axis therethrough into the spaces between the side walls and on each side of the intermediate wall, with a plurality of spring metal contacrs mounted in said housing by means of a plurality of vertical slots, said slots formed in the first, intermediate, and second side walls generally orthogonal to the elongate axis of said housing, said slots open on the side opposite said third side so as to accept the spring contacts from the open side of the housing, said contacts having lugs extending therefrom which extend through the bottom of the housing to make contact with the circuit board, and said spring contacts in each space including at least one pair of balanced spring contacts comprising a first spring contact over the open side of the housing proximate the first end surface mounted in a vertical slot in the first side wall and a vertical slot in the intermediate wall so as to press against the side of a plug inserted into the housing, and a second spring contact extending along the third side wall parallel to the elongate axis and mounted proximate the second end surface in vertical slots in the intermediate, and side walls so as to press against the other side of the plug inserted into the housing to balance the force of said first spring contact.

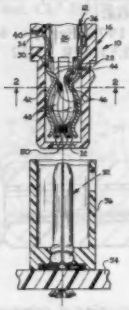
4,002,400

ELECTRICAL CONNECTOR

Robert Franklin Evans, New Cumberland, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 1, 1975, Ser. No. 601,073
Int. Cl.² H01R 13/12
U.S. Cl. 339—258 R 11 Claims

7. An electrical connector comprising a conductive female socket terminal having a tubular portion, contact means at one end of said portion for forming an electrical connection between with an insulated conductor, and a plurality of contact beams projecting longitudinally from the other end of said portion and arranged generally cylindrically around the longitudinal axis of the terminal, each beam including first and second electrical contacts facing the axis, said first and second electrical contacts being spaced apart from each other along the axis, and a pivot contact facing away from the axis and located between the first and second electrical contacts; and a collar surrounding said beams, the inner surface of the collar engaging the pivot contacts to prevent movement thereof away from the axis, alternate first electrical contacts being spaced differentially from said portion whereby, upon insertion of a pin into the space between the beams, the lead end of the pin passes said second electrical contacts, engages alternate first contacts and then the remaining first contacts to move the same away from the axis and rock the beams about the pivot contact so that the second electrical contacts are forced against the pin.

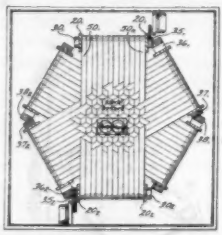


4,002,401

MULTIPLE PATTERN DISPLAY DEVICE

Kenneth E. Malberg, 2673 Greenbrier, Anaheim, Calif. 92801

Filed Sept. 18, 1975, Ser. No. 614,744
Int. Cl.² G02B 27/08; B44D 2/00
U.S. Cl. 350—4 11 Claims



1. A display device for cyclically exposing a plurality of messages to view, comprising:

a housing;

an aperture formed in the surface of said housing;

a plurality of parallel first strips disposed in said housing and aligned along a first axis of translation below said aperture;

a plurality of parallel second strips disposed in said housing and aligned along a second axis of translation below said aperture, alternative ones of said second strips being interlaced with alternative ones of said first strips; and

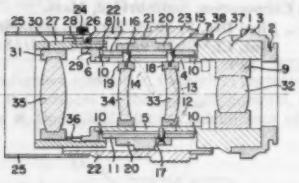
means for advancing said first and second strips in coherent advancement

4,002,402

LENS HOOD FOR ZOOM LENSES

Hiroshi Mito, 527 Minaminakamaru, Omiya, Saitama, Japan

Filed Jan. 15, 1975, Ser. No. 541,204
Claims priority, application Japan, Feb. 27, 1974, 49-23486
Int. Cl.² G02B 7/10; G03B 11/04
U.S. Cl. 350—58 2 Claims



1. A lens hood device for a zoom lens system, comprising:

a fixed lens barrel for supporting an image forming lens component;

an operating ring rotatably mounted about the periphery of said fixed lens barrel, and further mounted for movement along the optical axis of said image forming lens component;

a lens hood comprising a lens hood ring detachably secured to a forward end of said operating ring;

a zoom operating ring threadedly engaged with said operating ring by a first helicoid portion for movement together with said operating ring along the optical axis, and being disposed against rotation relative to said fixed lens barrel;

a cam ring mounted for rotation at a fixed position about the optical axis relative to said fixed lens barrel and being capable of rotation together with the movement of said zoom operating ring along the optical axis relative to said fixed lens barrel, said cam ring having a cam slot for effecting movement of a zoom lens component which is disposed against rotation relative to said fixed lens barrel along the optical axis, and said cam slot of said cam ring being so disposed as to move said zooming lens component along the optical axis relative to said image forming component so that said zooming lens system may be zoomed to the Tele side when said operating ring is moved forwardly along the optical axis relative to said fixed lens barrel;

said lens hood ring being so disposed as to be capable of preventing light rays from any point outside the field angle in the zooming lens system during a zooming operation from coming into said focusing lens component when said operating ring is moved along the optical axis relative to said fixed lens barrel; and

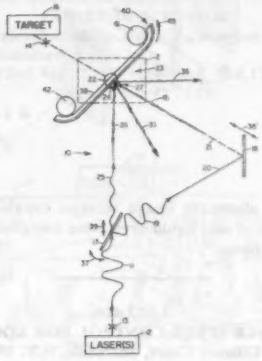
a focusing operating ring in threaded engagement with said fixed lens barrel by a second helicoid portion, said focusing operating ring being mounted for rotation together with said operating ring and a focusing lens component being supported by said focusing operating ring, whereby together with the rotation of said operating ring relative to said fixed barrel said first helicoid portion effects movement of said operating ring along the optical axis relative to said fixed lens barrel and concurrently said operating ring moves said focusing operating ring along the optical axis via the second helicoid portion, the pitch of said first and second helicoid portions being substantially equal whereby said focusing operating ring moves said focusing lens component along the optical axis relative to said fixed lens barrel and said operating ring moves said lens hood ring in the same direction along the optical axis by substantially the same amount as the amount said focusing lens component is moved.

4,002,403

SUPPRESSING SUPERRADIANCE

Philip J. Mallozzi; Harold M. Epstein; David C. Applebaum, all of Columbus; William J. Gallagher, Worthington, and Bernerd E. Campbell, Columbus, all of Ohio, assignors to Battelle Memorial Institute, Columbus, Ohio

Filed Oct. 11, 1973, Ser. No. 405,444
Int. Cl.² G02B 5/23
U.S. Cl. 350—160 R 24 Claims



1. A method of directing a radiation pulse from a source to a selected location and preventing undesired earlier radiation from the source having less than a selected intensity from reaching the selected location, comprising

directing a major portion of the radiation pulse energy along a main path to a predetermined region and continuing on toward the selected location,

positioning a reflective surface comprising a thin reflective layer in the predetermined region to prevent energy impinging thereon from continuing on toward the selected location,

directing a minor portion of the radiation pulse energy along a secondary path, and

using the energy of the minor portion to actuate a substantial removal of the reflective layer in the predetermined region when the minor portion has the selected intensity and before the corresponding major portion of the radiation pulse reaches the predetermined region, so that when the minor portion of the radiation pulse energy along the secondary path has at least the selected intensity, and thus causes the reflective layer to be substantially removed, the major portion of the radiation pulse reaching the predetermined region thereafter can continue on through the region toward the selected location.

4,002,404

IMAGING SYSTEM WITH LATENT ALIGNMENT IMAGE

Gary A. Dir, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 7, 1975, Ser. No. 539,146
Int. Cl.² G02F 1/16
U.S. Cl. 350—160 LC 22 Claims

1. A method of imaging comprising:

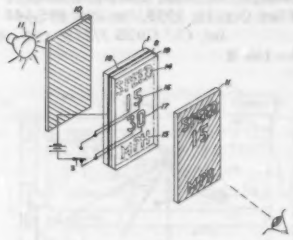
a. providing a uniformly treated substrate capable of aligning a liquid crystalline composition substantially uniformly in a first direction;

b. forming a latent alignment image on said treated substrate without removal of material therefrom; and

c. developing said latent alignment image by contacting said treated substrate with a liquid crystalline composition wherein background areas of the treated substrate align molecules of said liquid crystalline composition in said first direction and said latent alignment image of said substrate aligns molecules of said liquid crystalline composition in a second direction.

9. A latently imaged member, comprising:

a. a uniformly treated substrate capable of aligning molecules of a liquid crystalline composition substantially uniformly in a first direction; and



b. a latent alignment image thereon capable of aligning molecules of said liquid crystalline composition in a second direction.

4,002,405

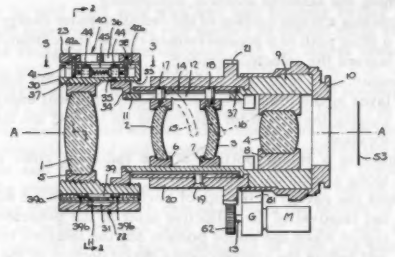
VARIABLE SPEED CONTROL FOR ZOOMING

Curt Stahl, 1 Gilmore Court, Scarsdale, N.Y. 10583

Filed Apr. 3, 1975, Ser. No. 564,917

Int. Cl.² G02B *15/00*; **G03B** *3/00*

U.S. Cl. 350—187 **12 Claims**



1. A zoom control for a lens system having a movable zoom component for selectively increasing and decreasing the image magnification of an object on a given focal plane, comprising:

variable speed drive means cooperating with said zoom component for driving said zoom component toward and away from said focal plane at any of a plurality of different speeds,

control means including a control member movable between a null position and a plurality of spaced positions on each side of said null position, said null position corresponding to zero speed of said drive means and each of said positions on one side of said null position corresponding to a respective one of said speeds of said drive means for driving said zoom component in a direction toward said focal plane and each of said positions on the other side of said null position corresponding to a respective one of said speeds of said drive means for driving said zoom component in a direction away from said focal plane,

electric circuit means operatively connecting said control means to said drive means for actuating said drive means at a speed which corresponds to the selected one of said plurality of positions of said control member in response to movement of said member to such selected position, and

cylindrical housing means housing said lens system and adapted to be stabilized by the hand of the operator, said control means being supported by said housing means substantially within the axial dimension of said housing means so that the operator can with one hand stabilize the lens system and operate said control means.

4,002,406

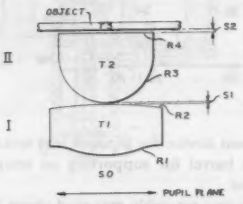
MICROSCOPE CONDENSER

Milton H. Sussman, Amherst, N.Y., assignor to American Optical Corporation, Southbridge, Mass.

Filed Dec. 8, 1975, Ser. No. 638,486

Int. Cl.² G02B *9/06, 21/02, 13/18*

U.S. Cl. 350—189 **2 Claims**



1. An improved microscope condenser having a front focal plane external to the glass comprising, in sequence, a biconvex positive singlet I and a convex-plano positive singlet II aligned along an optical axis, which singlets have parameters of lens radii (R), and minus sign (−) indicates center of curvature on the pupil side of the lens, thickness (T), spacing (S), index of refraction (ND and Abbe number (ν) as follows:

Lens	Radius	Thickness	Spacing	Index of Refraction	Abbe Number
			S_0= 0.5828X		
	R_1= 1.4794X				
I		T_1= 0.7869X		1.522<ND₁ <1.524	ν_1=58
	R_2= −6.5954X				
			S_1= 0.0095X		
	R_3= 0.7313X				
II		T_2= 1.0618X		1.522<ND₂ <1.524	ν_2=58
	$R = \infty$				
			S_2= 0.0381X		

wherein X is 9 to 11mm, the surface having radius R_1 is axially symmetrical aspherical with a conic coefficient (k) of −1·0 and deformation coefficients d of $+0.229394 \cdot 10^{-6}$, e of $-0.906333 \cdot 10^{-7}$, f of $+0.105699 \quad 10^{-8}$ and g of $-0.139724 \cdot 10^{-10}$

4,002,407

OBJECTIVE

Haruo Maeda, Fuchu, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Dec. 4, 1975, Ser. No. 637,682

Claims priority, application Japan, Dec. 6, 1974, 49-140718

Int. Cl.² G01B *21/02, 9/12*

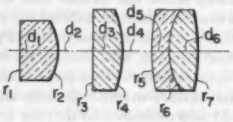
U.S. Cl. 350—229 **1 Claim**

1. An objective comprising a first positive lens component, a second positive lens component and a third positive cemented doublet lens component, and said objective having the following numerical data:

$f = 1.0$, NA = 0.35, WD = 0.164, $\beta = 13.5x$

$r_1 = \infty$
$r_1 = 0.4861$ $n_1 = 1.51633$ $\nu_1 = 64.1$
$r_2 = -0.5612$
$r_3 = 0.4111$
$r_3 = \infty$
$r_3 = 0.3897$ $n_2 = 1.51633$ $\nu_2 = 64.1$
$r_4 = -1.3446$
$r_4 = 0.3592$
$r_5 = 2.3324$
$r_5 = 0.2109$ $n_3 = 1.74077$ $\nu_3 = 27.8$
$r_6 = 0.8853$
$r_6 = 0.3782$ $n_4 = 1.51633$ $\nu_4 = 64.1$
$r_7 = -2.1008$

wherein the reference symbols r_1 through r_7 represent radii of curvature on the surfaces of the lens components, the reference symbols d_1 through d_6 denote thicknesses of the lens

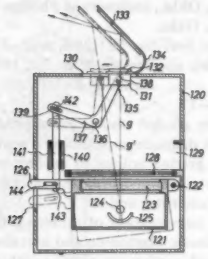


elements and air spaces, reference symbols n_1 through n_4 designate refractive indices of the lens elements and reference symbols ν_1 through ν_4 represent Abbe's numbers of the lens components.

4,002,408
SYSTEM AND DEVICE FOR OVERHEAD PROJECTION

Michito Amma, Tokyo, Japan, assignor to Gakken Co. Ltd., Tokyo, Japan

Filed Dec. 10, 1971, Ser. No. 205,832
Int. Cl.² B03B 21/00
U.S. Cl. 353—70 21 Claims

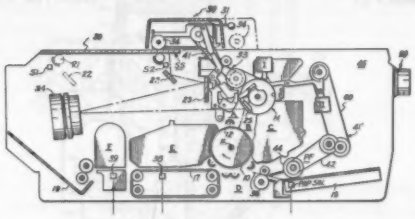


1. An overhead projector comprising in combination:
a casing;
a stage on which an object to be imaged is placed and said stage being supported by said casing;
illumination means for said object disposed on one side of said stage and said illumination means being disposed within said casing;
a projection lens system disposed on the opposite side of said stage and having a predetermined optical axis;
said projection lens system being so positioned that the axis of light from said illumination means passes through the center of said projection lens system at an angle relative to said predetermined optical axis of said projection lens system, and
wherein said stage is a substantially horizontal stage within said casing, said illumination means is mounted below said stage and adjustable between horizontal and inclined conditions, said projection lens system is disposed above said stage and parallel thereto, said projection lens system being slidably received in the top of said casing and operatively connected to said illumination means in such a manner that the axis of the light therefrom passes through the center of said projection lens system at right angles when said illumination means is horizontal and obliquely when said illumination means is inclined, and including a mirror connected to said projection lens system for slidable movement therewith.

4,002,409
CHAIN FEED CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR

William L. Valentine, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 1, 1975, Ser. No. 564,172
Int. Cl.² G03G 15/00
U.S. Cl. 96—1 R 26 Claims



1. A multi-mode copier/duplicator comprising:
an optical system for operation of said copier/duplicator in a first mode for copying a document up to a first size onto a copy sheet up to said first size or for copying a document up to a second size larger than said first size onto a copy sheet up to said second size;
document feeding means operative in said first mode for moving documents relative to said optical system;
first sensing means for sensing a document at said document feeding means;
second sensing means for sensing whether said copy sheets are up to said first size or are larger than said first size up to said second size;
first timing means for controlling in said first mode a first portion of said copier/duplicator machine cycle;
second timing means for controlling in said first mode a second portion of said copier/duplicator machine cycle responsive to said second sensing means sensing said copy sheets up to said first size; and
said first timing means in said first mode being responsive to said second sensing means sensing copy sheets up to said first size and to said first sensing means for automatically starting said first portion of said copier/duplicator machine cycle during and simultaneously with said second portion of said copier/duplicator machine cycle.

4,002,410
APPARATUS AND METHOD FOR ORIENTING MONOCRYSTALLINE MATERIAL FOR SAWING

Roger A. Frederick, St. Louis, and Thomas E. Reichard, Kirkwood, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

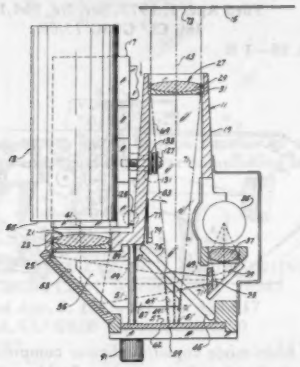
Filed Mar. 17, 1975, Ser. No. 559,194
Int. Cl.² G01N 21/04
U.S. Cl. 356—31 13 Claims

1. A portable device adapted for being quickly secured to and removed from a body of monocrystalline material to be sawed for aligning said body with respect to a saw balde in order to permit sawing of said monocrystalline material by the blade with precisely predetermined crystallographic orientation, said device comprising:
a viewing screen for displaying imaged light patterns;
at least one light source;
first collimator means, including a first lens, for collimating

the light from the light souce to provide a first collimated light beam directed toward a surface of the monocrystalline material for reflection in the reverse direction, the reverse reflection being directed back through the first lens;

means for imaging the first said reverse reflection on the screen to display on the screen a light pattern characteristic of a crystallographic plane of the monocrystalline material, the position of said pattern on the screen correspondig to the orientation of said device with respect to said crystallographic plane;

second collimator means, including a second lens, for collimating the light from the light source to provide a second collimated light beam directed toward the surface of the blade for reflection in the reverse direction, the reverse reflection being directed back through the second lens;



means for imaging the second said reverse reflection on the screen to display on the screen a light pattern the position of which on the screen corresponds to the orientation of the blade with respect to said device;

a small enclosure for containing the screen, the light source both collimator means, and both said imaging means; and

means for clamping said enclosure to the body of monocrystalline material and for selectively orienting said device with respect to said body.

4,002,411

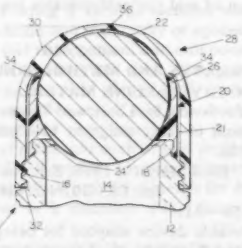
BALL TYPE DISPENSING PACKAGE

Paul W. Harbauer, Perrysburg, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Sept. 2, 1975, Ser. No. 609,338

Int. Cl.² B43K 9/00, 7/10

U.S. Cl. 401—213 **1 Claim**



1. An improved ball applicator dispensing package comprising, in combination:

a container having a neck portion defining an opening at the end thereof for dispensing the contents of said container, said neck portion including external threads and a circumferential groove formed above said threads;

an annular ball-retaining fitment of a resilient material having an inwardly extending rib adjacent one end thereof in engagement with said groove in said neck and a plurality of inwardly extending flanges intermediate said rib and the opposite end of said fitment, the end of said fitment opposite said rib terminating in a generally flat, downwardly and outwardly tapering rim portion defining an opening through said fitment;

a dispensing ball, having a diameter greater than the diameter of the opening in said fitment defined by said rim, with a majority portion thereof inserted and held by said fitment, the lower portion of said ball being seated on said flanges, with a minority portion of said ball extending beyond said fitment to define a dispensing surface; and

a closure member having internal threads for engagement with the threads on said neck, said closure member including a downwardly depending annular sealing fin inclined away from the center line of said closure and having a normal diameter substantially equal to the diameter of the downwardly and outwardly tapering rim portion of said fitment, said sealing fin being distorted outwardly into sealing engagement with said rim portion when said closure member is fully engaged on the neck portion of said container to thereby create a primary seal between said closure member and said retaining fitment without distorting said retaining fitment or said dispensing ball, and further including an interior cavity terminating adjacent the inner edge of said sealing fin and having a maximum chordal dimension at said terminus slightly less than the chordal dimension of said ball at the point to thereby create a secondary seal between said wall and said interior cavity at this location with the remainder of said ball minority part being out of engagement with said interior cavity.

4,002,412

STABILIZING OPEN GRADED ASPHALT-CONCRETE

Richard J. Bennett; Lew T. Gray, and Dale F. Levy, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 501,203, Aug. 28, 1974, Pat. No. 3,907,449. This application Mar. 27, 1975, Ser. No. 562,914

Int. Cl.² E01C 7/00

U.S. Cl. 404—17 **2 Claims**

1. An open graded course of asphalt-concrete stabilized against lateral displacement under a moving load comprising:

1. an open graded course of asphalt-concrete,
2. particulate matter within the interstices of said course of asphalt-concrete, and
3. a cured composition of cohering material comprising a thermoplastic elastomer and a resinous material consolidating said particulate matter within the interstices.

4,002,413

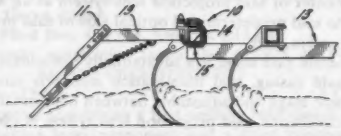
ADJUSTABLE MOUNTING FOR AUXILIARY FARM IMPLEMENT

Phillip W. Foster, Rochelle, Ill., assignor to Lee Blacksmith, Inc., Rochelle, Ill.

Filed Sept. 8, 1975, Ser. No. 611,508

Int. Cl.² F16B 7/04

U.S. Cl. 403—234 **3 Claims**



1. A mounting for securing an auxiliary farm implement to

the frame of a first implement, said mounting including a bracket rigidly secured to the forward end of the auxiliary implement and having a first portion disposed in a generally vertical plane to abut the rear of said frame, said bracket having a second portion formed integrally on the upper end of said first portion and disposed in a generally vertical plane with at least a part of said second portion projecting rearwardly of said first portion, said part having a hole, a tongue rigid with the upper side of said second portion and spaced above the latter, said tongue projecting rearwardly and terminating adjacent the forward edge of said hole, an elongated vertical bolt having threads formed along its upper end portion, an elongated flexible chain comprising a plurality of connected links with one end of the chain being pivotally connected to the lower end of said bolt and the other end being free, one of said links adjacent the free end of said chain being received on said tongue and the portion of the chain between said one link and said bolt extending across the top, the forward side and the bottom of said frame, said bolt being behind said first portion of said bracket with the threaded end portion projecting through said hole and above said tongue, and securing means including a nut threaded on the upper end of said bolt and bearing on the rear end of said tongue, said securing means being operable to tighten said chain securely around said frame.

4,002,414

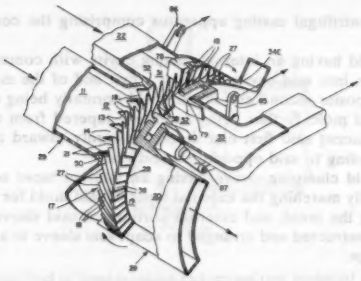
COMPRESSOR-EXPANDER ROTOR AS EMPLOYED WITH AN INTEGRAL TURBO-COMPRESSOR WAVE ENGINE

Richard R. Coleman, Jr., 8 Colonial Way, Malvern, Pa. 19355, and Helmut E. Weber, 2005 Welsh Valley Road, Valley Forge, Pa. 19481

Division of Ser. No. 191,410, Oct. 21, 1971, Pat. No. 3,811,796. This application Apr. 25, 1974, Ser. No. 464,047

Int. Cl.² F04B *11/00*

U.S. Cl. 416—223 A **2 Claims**



1. A rotor for producing torque in rotary type engine comprising in combination: a rotor hub means having an axis of rotation and first and second sides disposed substantially perpendicular to said axis of rotation; a plurality of chambers formed integral with said hub and formed to hold gases therein; each of said chambers having first and second sections; each of said first sections is disposed to lie along a direction having a component which is parallel to said axis of rotation and which component is larger in the first section than the corresponding component in said second section and further formed to have parallel walls and a constant cross-section dimension of A and further formed to have an opening at said first side of said hub; each of said second section is disposed to lie in a direction having a large component perpendicular to said axis of rotation and formed to have parallel walls and a constant cross-section dimension of B, wherein B is very much smaller than A so that there is a constriction in each chamber whereat its first section joins its second section, said second section further formed to have an opening at said second side of said hub whereby when gas is in any of said chambers and a shock wave is transmitted through said gas in said first section, it will be transformed into a reflected shock wave by said constriction to compress said gas into high pressure gas in said first section and whereby when said high pressure gas passes through said second section said hub is driven around its axis of rotation by a reaction phenomenon.

4,002,415

DISTRIBUTOR TYPE FUEL INJECTION PUMPS

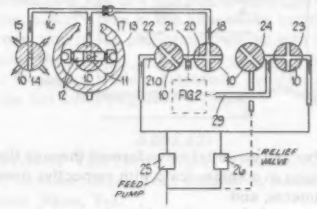
Wilfrid Edward Walter Nicholls, East Molesey, and Paul Lakra, Wembley, both of England, assignors to C.A.V. Limited, Birmingham, England

Filed Aug. 4, 1975, Ser. No. 601,432

Claims priority, application United Kingdom, Aug. 13, 1974, 35578/74

Int. Cl.² F04B *25/00*

U.S. Cl. 417—245 **12 Claims**



1. A distributor type fuel injection apparatus comprising a body, a rotary distributor member located in the body, an injection pump including a pumping chamber in which is located a reciprocable pump plunger, cam means for imparting movement to the plunger to displace fuel from said pumping chamber, a delivery passage in said distributor member in communication with said pumping chamber, a plurality of outlet ports in said body and with which said delivery passage registers in turn during successive delivery strokes of the injection pump, a source of fuel under pressure, first valve means through which fuel can flow to the injection pump during the filling strokes thereof and means for controlling the amount of fuel supplied to the injection pump during the filling strokes, said means including a shuttle movable axially in a bore, one end of said bore being connectible through said first valve means to said pumping chamber, second valve means operable to place said one end of the bore in communication with said source of fuel, an electrically operable valve for allowing fuel to escape from the other end of said bore during at least part of the time said one end of the bore is in communication with said source of fuel, third valve means operable to connect said other end of the bore to said source of fuel, and control circuit means including a sensor for sensing the position of the shuttle during the time said electrically operable valve is open, and for effecting closure of said electrically operable valve when the shuttle has moved the required amount away from said one end of the bore, the fuel contained in said one end of the bore being delivered to the injection pump at the next filling stroke thereof.

4,002,416

MOTOR POWERED BY WAVE ACTION

Roy Morgan Axford, No. 5 Ringbit, Rolling Hills, Calif. 90274

Filed Jan. 15, 1976, Ser. No. 649,269

Int. Cl.² F04B *35/00*

U.S. Cl. 417—330 **6 Claims**

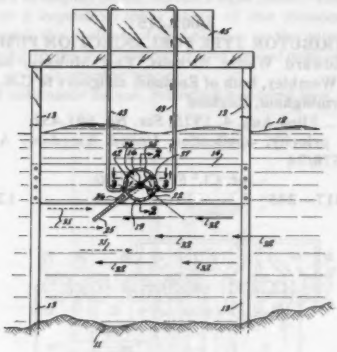
1. A motor activiated by ocean wave action comprising:

a shaft disposed on a subsantially horizontal axis which is substantially parallel to the wave action;

a water paddle radially disposed from said shaft and to rotate about the axis so that any wave action in said ocean causes said paddle to tortionally oscillate about said axis;

means for converting the oscillating motion of said paddle to useful work, said means comprising:

a cylindrical housing with annular end caps:
said shaft protruding through said annular end caps;
a radially disposed fixed vane in said housing;
a radially disposed oscillating vane mounted within said housing and onto said shaft, to divide said housing into two compartments:



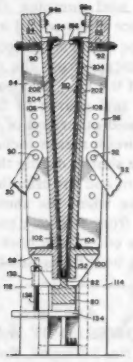
an inlet valve and an outlet valve formed through the wall of said housing to communicate with respective ones of said compartments; and
a standpipe coupled to each outlet valve to deliver water to a place of use.

4,002,417

APPARATUS FOR FOLDING A SHEET OF PLASTIC MATERIAL

Camillo M. Vecchiotti, Ridgewood, and Bruce S. Goldberg, Clifton, both of N.J., assignors to Amerace Corporation, New York, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,980
Int. Cl.² B29C *17/02*
U.S. Cl. 425—385 **15 Claims**



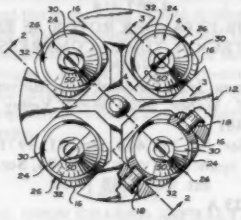
1. Apparatus for folding a sheet of brittle material comprising a support frame; support means pivotably mounted with respect to said frame and defining a support surface for at least part of said sheet; means operatively associated with said frame and said support means for pivoting said support means relative to said frame from a first position to a second position to form a fold in said sheet; said support means including a first member adapted to engage a first portion of said at least part of said sheet in said second position of said support means; and a second member movable with respect to said first member, said second member adapted to support a second portion of said at least part of said sheet for movement relative to said first member for folding said sheet to form additional fold therein spaced from said first-mentioned fold in said sheet; and means mounted relative to said support frame for applying heat to said sheet material in the region of said first-mentioned fold and said additional fold in a sequence corresponding to said pivoting of said support means from said first position to said second position, and said movement of said member with respect to said first member, respectively; wherein said support means first position is a substantially horizontal plane relative to said support frame and wherein said support means is adapted to lie in a substantially vertical plane in said second position.

4,002,418

CASTING APPARATUS

Henry W. Wallace, Southbridge, Mass., assignor to American Optical Corporation, Southbridge, Mass.

Filed July 10, 1975, Ser. No. 594,905
Int. Cl.² B29C *5/04*
U.S. Cl. 425—425 **10 Claims**



1. Centrifugal casting apparatus comprising the combination of:
a mold having an internal casting cavity with communication into said cavity adjacent a first end of the mold, an opposite second end of the mold normally being closed, said mold further being exteriorly tapered from a point adjacent said first end thereof inwardly toward and extending to said opposite second end;
a mold clamping sleeve having an internal taper substantially matching the external taper of said mold for receiving the mold, and external portions of said sleeve being constructed and arranged to adapt said sleeve to a centrifuge.

4,002,419

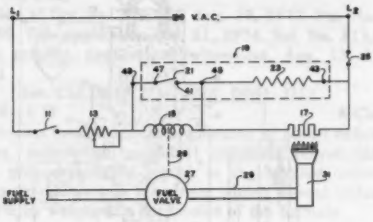
DIRECT BURNER IGNITION SYSTEM

Melvin E. Hantack, St. Louis, and Paul D. Frazier, West Plains, both of Mo., assignors to Eaton Corporation, Cleveland, Ohio

Filed Feb. 26, 1975, Ser. No. 553,342
Int. Cl.² F23H *5/14*
U.S. Cl. 431—67 **7 Claims**

1. Electrical circuitry for controlling the operation of a fuel supply valve which regulates the flow of fuel to a direct ignition system fuel burner, said electrical circuitry comprising:
means for igniting said flow of fuel, said igniting means adapted to be mounted in promimity to said burner;
means for actuating said fuel supply valve, said valve actuating means being connected electrically in series with said igniting means; and
thermal switch means including electrical heater means and switching means actuated by said electrical heater means, said electrical heater means being connected electrically in series with said switching means and connected electri-

cally in parallel with said igniting means, said switching means being connected electrically in parallel with said valve actuating means and operable to shunt said valve actuating means until a predetermined minimum voltage has been applied to said electrical heater means for a



period of time sufficient to permit said electrical heater means to be heated to a steady state condition, said predetermined minimum voltage being of sufficient magnitude to heat said igniting means to the ignition temperature of said fuel during the time said electrical heater means is being heated to said steady state condition.

4,002,420

METHOD OF BURNING CALCINED AND UNCALCINED PULVEROUS RAW MATERIAL AND ROTARY KILN PLANT THEREFOR

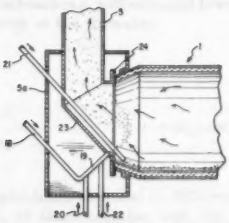
Soren Bent Christiansen, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.

Filed May 7, 1975, Ser. No. 575,407

Claims priority, application United Kingdom, May 10, 1974, 20839/74

Int. Cl.² F27B *15/00*

U.S. Cl. 432—14 **49 Claims**



1. A method of heat treating pulverous raw material consisting entirely of or at least containing a portion of the time to produce at least a partial calcination thereof prior to passing the material down through an inclined rotary kiln for further heat treatment, the kiln having hot gases generated therein and communicating at its material inlet end portion with a multistage raw material preheating means and a calcination chamber through which the hot kiln gases are directed comprising:

a. introducing into at least one of the upper material inlet end portion and lower material outlet end portion of the kiln, an amount of fuel sufficient for preheating, at least partially calcining, and substantially completely burning the material, at least part of said fuel being introduced into the lower end portion of the kiln;

b. introducing into the lower end portion of the kiln an amount of oxygen-containing gas sufficient for substantial combustion of the fuel introduced into said kiln;

c. introducing pulverous raw material into the multistage preheating means;

d. preheating the raw material in said multistage preheating unit by contact with hot gases exiting from the kiln;

e. introducing the preheated material from the penultimate stage of the preheating means into the upper material inlet end portion of the kiln proper at a location and in a manner to cause substantially all of the material to be entrained by the hot kiln exit gases exiting from the upper inlet end portion of the kiln;

f. directing said hot kiln exit gases and entrained material from the upper material inlet end portion of the kiln into the calcination chamber communicating therewith and permitting said material to be at least partially calcined by the contact with said hot kiln exit gases;

g. directing the hot kiln exit gases and the at least partially calcined material entrained therein to the last stage of the preheating means;

h. separating the at least partially calcined material from said hot kiln exit gases in said last stage; and

i. re-introducing said separated material into the upper material inlet end portion of the kiln proper along a separate path and at a location downstream with respect to the material flow in the kiln, of the location of initial introduction of the preheated material into the kiln, and causing the material to pass through the kiln for further heat treatment while substantially avoiding entrainment by the hot kiln exit gases.

4,002,421

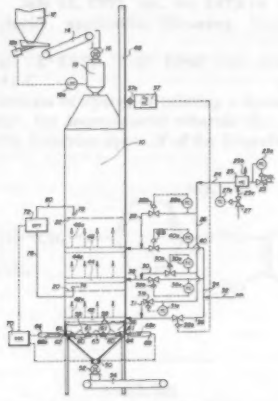
CONTROL OF VERTICAL HEAT TREATING VESSELS

James R. Summer, Blum, Tex., assignor to Round Rock Lime Company, Blum, Tex.

Division of Ser. No. 467,139, May 6, 1974, Pat. No. 3,884,621, which is a continuation-in-part of Ser. No. 383,484, July 30, 1973, Pat. No. 3,849,061. This application Mar. 7, 1975, Ser. No. 556,282

Int. Cl.² F27D *7/00;* **F27B** *9/40*

U.S. Cl. 432—19 **15 Claims**



1. In a process for heat treating particulate material of nonuniform gradation in a vertical vessel wherein the particulate material is passed to the particulate inlet at the upper end of the vessel causing the material to gravitate at a constant rate through a heat treating zone in the vertical vessel wherein it is contacted with upwardly moving heat treating fluid and thereafter removed from the particulate outlet at the lower end of said vessel, the improvement comprising:

sensing a quality indicative of the bulk density of said particulate material passing through said heat treating zone and regulating the heat input carried by said heat treating fluid to said heat treating zone in response to variations in the measured quality indicative of the bulk density of said particulate material passing through said heat treating

zone to yield a product which has been heat treated equivalent to a charge of standard particles having a predetermined bulk density.

4,002,422

PACKED BED HEAT EXCHANGER

Robert Milton Escott, Charlotte, N.C., assignor to Midrex Corporation, Charlotte, N.C.

Filed Sept. 22, 1975, Ser. No. 615,460
Int. Cl.[2] F27D *1/08, 1/12;* **F27B** *9/10*
U.S. Cl. 432—99 **7 Claims**

1. Apparatus for treating particulate material with hot gases comprising:

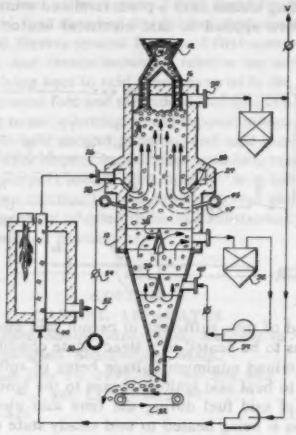
a. a substantially vertical shaft furnace;

b. means for introducing particulate material at one end of said shaft furnace to form a packed bed therein;

c. means for removing treated particulate material at the other end of said furnace, thereby setting up a gravitational flow of material therein;

d. means intermediate said material introduction means and said material removal means for introducing hot process gas to said bed of material;

e. means intermediate said hot gas introduction means and said material removal means for introducing cold process gas to said packed bed, and for moving said cold process gas inwardly through said packed bed, whereby a portion of the heat of said descending bed is transferred to said cold process gas, heating and upgrading said gas which



then flows upwardly through the bed contributing to the process in the same manner as the hot process gas.

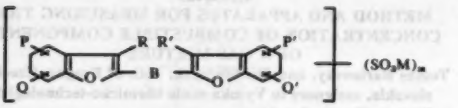
4,002,423

BENZOFURAN DERIVATIVES PROCESS FOR THEIR PREPARATION AND THEIR USE AS OPTICAL BRIGHTENERS

Wilfried Sahm, Kelkheim, Taunus; Erich Schinzel, Hofheim, Taunus, and Gunter Rösch, Altenhain, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Division of Ser. No. 279,531, Aug. 10, 1972, Pat. No. 3,859,350. This application Oct. 11, 1974, Ser. No. 513,997
Claims priority, application Switzerland, Aug. 13, 1971, 11924/71
Int. Cl.² D01F 2/14, 2/16; D06L 3/12
U.S. Cl. 8—1 W 8 Claims

1. A process for the optical brightening or acetyl cellulose, polyesters, polyolefins, polyvinyl chloride, polyvinylidene chloride, polyacrylonitrile, native or regenerated cellulose, wool or polyamide which comprises adding to said materials 0.01 to 2% by weight of a compound of the formula



in which B′ is a direct bond, vinylene or a bivalent radical being in conjugation with the adjacent double bonds of the furane nuclei selected from the group consisting of phenylene, biphenylene, terphenylene, styryl, biphenylylethylene, stilbylene, naphthylene, furanylene and thienylene;

R and R′ which are identical or different, are hydrogen, halogen, lower alkyl, phenyl, or SO_3M;

M is a colorless cation;

P, Q, P′ and Q′, which are identical or different, are hydrogen, halogen, lower alkyl, lower alkoxy, phenyl, COOM, SO_3M, lower carboalkoxy, sulfonic acid lower alkyl ester, cyano, or a group of the formulae

in which X and Y, which are identical or different, are hydrogen, or lower alkyl, or stand together with the nitrogen for piperidyl, morpholyl or piperazyl, and P and Q together or P′ and Q′ together are the same or different bivalent radicals selected from the group consisting of lower alkylene and an anellated benzene nucleus; and m is a number from 0 to 4.

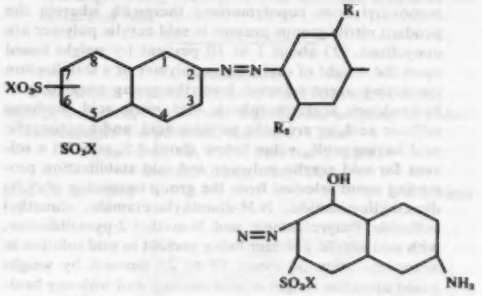
4,002,424

SOLUTION OF ISOMER MIXTURE OF NAPHTHYLAZOPHENYLAZONAPHTHYL DISULFONATE DYE

Sanford Byrom Smith, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 14, 1973, Ser. No. 369,816
Int. Cl.² C09B 31/02; D06P 1/00, 1/615; D21H 1/46
U.S. Cl. 8—26 7 Claims

1. A dye solution consisting essentially of two or three mixed isomers, water, triethanolamine, a lithium base, and urea, wherein the mixed isomers are at least 10% by weight of the solution and have the formula



wherein the isomers differ from each other in the location of at least one of the two -SO_3X substituents on the naphthyl radical, said substituents being located in at least two of the following three locations, the 4,8 positons, the 6,8 positions and the 5,7 positions, each of two of the isomers being present in the amount of at least 25% by weight of the mixed isomers, and

wherein R_1 and R_2 are independently H, or alkyl or alkoxy of 1 to 2 carbons, and X is a cation selected from the group consisting of Na^+, Li^+, K^+ and $(HOC_2H_4)_n\text{-}N^+H_{4-n}$ where n is 2 or 3.

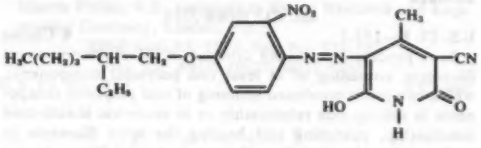
4,002,425

WATER-INSOLUBLE MONOAZO DYESTUFFS

Ernst Heinrich; Horst Kindler, both of Frankfurt am Main-Fechenheim, and Joachim Ribka, Offenbach (Main)-Burgel, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Germany

Division of Ser. No. 516,360, Oct. 21, 1974. This application July 18, 1975, Ser. No. 597,018
Claims priority, application Germany, Oct. 22, 1974, 2352858
Int. Cl.² C09B 27/00; D06P 1/02, 3/12
U.S. Cl. 8—41 C 3 Claims

1. In the process of dyeing or printing a hydrophobic synthetic material, the improvement wherein the dyestuff is a water-insoluble monoazo dyestuff of the formula



4,002,426

PRODUCTION OF STABILIZED NON-BURNING ACRYLIC FIBERS AND FILMS

Edward Clarence Chenevey, North Plainfield, and Robert Michael Kimmel, Springfield, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Continuation of Ser. No. 109,669, Jan. 25, 1971, abandoned. This application Mar. 5, 1974, Ser. No. 448,235
Int. Cl.² C01B 31/07
U.S. Cl. 8—115.5 18 Claims

1. A process for the production of stabilized acrylic fibers and films which are capable of undergoing carbonization comprising:

a. providing a solution consisting essentially of (1) an acrylic polymer selected from the group consisting of an acrylonitrile homopolymer and acrylonitrile copolymers containing at least about 85 mol percent of acrylonitrile

units and up to about 15 mol percent of one or more monovinyl units copolymerized therewith wherein the pendant nitrile groups present in said acrylic polymer are uncyclized, (2) about 1 to 10 percent by weight based upon the weight of said acrylic polymer of a stabilization promoting agent selected from the group consisting of hydrochloric acid, phosphoric acid, nitric acid, methane sulfonic acid, an aromatic sulfonic acid, and a carboxylic acid having a pK_a value below about 4.5, and (3) a solvent for said acrylic polymer and said stabilization promoting agent selected from the group consisting of N,N-dimethylformamide, N,N-dimethylacetamide, dimethyl sulfoxide, butyrolactone, and N-methyl-2-pyrrolidinone, with said acrylic polymer being present in said solution in a concentration of about 10 to 25 percent by weight based upon the weight of said solvent, and with any heating utilized during the formation of said solution being insufficient to produce cyclization of said pendant nitrile groups of said acrylic polymer,

b. extruding said solution through a shaped orifice via solution spinning to form an acrylic fibrous material or film wherein the pendant nitrile groups present in said acrylic polymer remain uncyclized and have incorporated therein about 0.1 to 10 percent based upon the weight of said acrylic polymer of said stabilization promoting agent which was initially present in said solution of step (a), and

c. heating said acrylic fibrous material or film having about 0.1 to 10 percent based upon the weight of said acrylic polymer of said stabilization promoting agent which was initially present in said solution of step (a) incorporated therein in an oxygen-containing atmosphere at a temperature of about 200° to 350° C. until a thermally stabilized fibrous material or film is formed which is black in appearance, non-burning when subjected to an ordinary match flame and which is capable of undergoing carbonization.

4,002,427

PROCESS FOR THE MANUFACTURE OF DYED MULTICOMPONENT FILAMENTS

Hilmar Möller, and Joachim Wiegand, both of Hofheim, Taunus, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 24, 1975, Ser. No. 589,864

Claims priority, application Germany, June 26, 1974, 2430626

Int. Cl.² D06B 5/16

U.S. Cl. 8—155.1 **6 Claims**

1. A process for making crimped, dyed multicomponent filaments, consisting of at least two polyester components, which comprises combined spinning of said polyester components in side-by-side relationship or in eccentric sheath-core relationship, stretching and heating the spun filaments to develop the crimp, winding the spun crimped filaments at a Shore hardness of from 15° to 70° on a bobbin having a tube containing orifices, and dyeing the spun crimped filaments while wound on said bobbin without significant loss of crimp, wherein said dyed filaments are capable of further processing into textile fabric without rewinding.

4,002,428

DEDUCTIVE METHOD FOR MEASURING ION CONCENTRATION ELECTRICALLY

Carl L. Blanchard, Stone Mountain, Ga., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed May 21, 1976, Ser. No. 688,657

Int. Cl.² G01N 27/00, 31/02

U.S. Cl. 23—230 R **8 Claims**

1. A method for measuring the concentration of a desired ion in a sample solution containing multiple ionic species without removing ions from solution comprising the steps of:

a. measuring the pH and specific conductivity of the sample solution and of a reagent solution;

b. adding and reacting a measured excess amount of said reagent solution of known constitution to a measured amount of sample solution wherein said reagent solution is capable of reacting with the desired ion to give a substantially non-ionic product without substantial reaction with other ions in solution;

c. measuring the pH and specific conductivity of the mixture obtained in step (b);

d. mathematically deducing the concentration of the desired ion by comparing the specific conductivity expected in a mixture of the sample solution and the reagent solution, assuming no reaction had taken place, with the measured specific conductivity for the solution obtained in (b) and by making any necessary corrections for pH changes and corrections for the solubility product of reaction between the desired ion and the reagent solution.

4,002,429

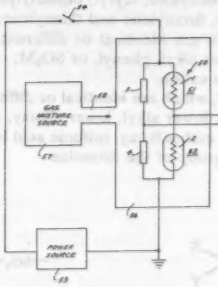
METHOD AND APPARATUS FOR MEASURING THE CONCENTRATION OF COMBUSTIBLE COMPONENTS OF A GAS MIXTURE

Tomáš Bartovský, and Jiří Sládeček, both of Prague, Czechoslovakia, assignors to Vysoka skola chemicko-technologicka, Prague, Czechoslovakia

Filed May 13, 1974, Ser. No. 469,453

Int. Cl.² G01N 27/16

U.S. Cl. 23—254 E **2 Claims**



1. For use with a catalytic electrical bridge wherein the burning of combustible components of a gas mixture in the catalytic portion of the bridge is effective to cause changes in the electrical balance of the bridge when the latter is electrically excited, an improved arrangement for efficiently measuring small concentrations of the combustible gas components in the gas mixture, which comprises:

means positioning the catalytic facilities of the bridge in a closed chamber;

means introducing the gas mixture into the closed chamber to be catalytically burned, thereby to induce changes of the output voltage of the bridge, when the latter is electrically excited in accordance with a characteristic that reaches equilibrium over a first interval following the commencement of excitation of the bridge when the concentration of combustible gas components in the mixture is zero;

means operative for exciting the bridge;

first and second capacitors;

switching means rendered effective at the conclusion of the first predetermined interval following the operation of the bridge exciting means and operable over a pescribed second interval for coupling the bridge output voltage to the input of the first capacitor;

an operational amplifier;

means for coupling the output of the first capacitor to the input of the operational amplifier; and

means for coupling the second capacitor between the output of the operational amplifier and the input thereof, whereby the voltage output of the operational amplifier during the prescribed second interval is indicative of the change of the bridge output voltage over the prescribed second interval.

4,002,430

EXTRACTION TUBE FOR POLYAMIDES

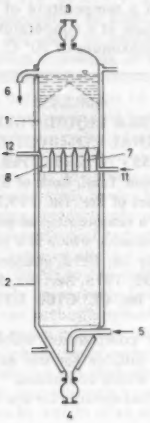
Werner Hoerauf; Ernst Guenther; Ernst Kissel; Guenter Valentin, all of Ludwigshafen, and Ernst Dietrich, Worms, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Jan. 27, 1975, Ser. No. 544,305

Claims priority, application Germany, Jan. 31, 1974, 2404510

Int. Cl.² B01D 11/02

U.S. Cl. 23—270 R 3 Claims



1. A tubular extraction apparatus for the continuous removal of low molecular weight components from polylactam granules by extraction with hot water using the countercurrent principle of operation, the water being fed upwardly and the granules downwardly, said apparatus comprising:

A. a vertically positioned, elongated extraction tube having inlet and outlet means for the granules and the water; and

B. at least one heat exchanger disposed laterally within the tube to divide the tube vertically into separate extraction zones with heating means in each heat exchanger to decrease the density of the water in a zone immediately above said heat exchanger in comparison to the density of the water immediately below the same heat exchanger, said at least one heat exchanger dividing the tube into an upper section extending above said at least one heat exchanger and a lower section extending below said at least one heat exchanger, the ratio of said sections to each other being from 50:50 to 85:15 by volume, excluding the volume of each heat exchanger and also excluding the free space above the level of granules in the tube, the smaller section being above the lowermost heat exchanger in the tube, each heat exchanger having a plurality of vertical ducts joined in a honeycomb pattern distributed over the entire cross-section of the tube for the uniform downward flow of granules with upper inlet surfaces leading into each duct on the upper side of said heat exchanger facing the stream of granules, said inlet surfaces being inclined to taper inwardly toward the vertical ducts at an angle β to the horizontal of from about 45° to about 83°, the vertical length of each heat exchanger being 1/20 to 1/7 of the total length of the extraction tube.

4,002,431

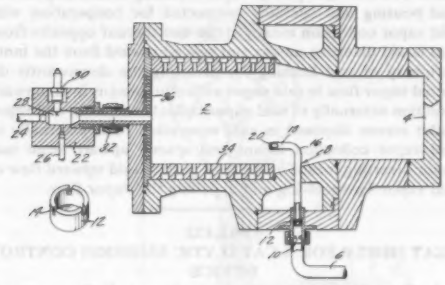
NITROUS OXIDE DECOMPOSITION REACTOR

George D. Lewis, North Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 19, 1975, Ser. No. 642,515

Int. Cl.² B01J 1/00, 7/00

U.S. Cl. 23—284 6 Claims



1. Apparatus for decomposing liquid nitrous oxide including:

a chamber having a side wall and opposite ends and having a discharge opening at one end;

an igniter at the other end of the chamber;

an injector for nitrous oxide in the wall of the chamber, said injector including a tube with one end extending into the chamber, said one end of the tube having a nozzle thereon and being positioned to discharge nitrous oxide toward the igniter, swirl means to impart a swirl to the nitrous oxide entering the tube, and

an orifice upstream of the swirl means for dropping the pressure below the vapor pressure of the nitrous oxide to convert a part of the liquid to a gas.

4,002,432

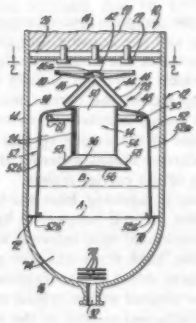
VAPOR-LIQUID SEPARATOR

John C. Brice, London, England, and Jose M. A. Peruyero, Morris Plains, N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Apr. 25, 1975, Ser. No. 571,782

Int. Cl.² B01D 19/00; B01J 8/02

U.S. Cl. 23—284 9 Claims



1. A vapor-liquid separator comprising, in combination, a substantially vertically disposed housing having an inner periphery and including a vapor-liquid separation zone; vapor-liquid inlet means connected to said housing at one end

thereof for introducing vapor-liquid mixture downwardly into said separation zone; liquid collecting and diverting means disposed in said separation zone for receiving liquid from said vapor-liquid inlet means and directing said liquid downwardly about said inner periphery of said housing; liquid outlet means disposed at the opposite end of said housing; vapor collection means disposed in said separation zone below said liquid diverting means for receiving vapor from said vapor-liquid inlet means causing it to flow downwardly and spaced inward from the inner periphery of said housing and said liquid diverting means in the location where said liquid flows downwardly about said inner periphery; vapor diverting means disposed in said housing and operably connected for cooperation with said vapor collection means at the end thereof opposite from said liquid diverting means and spaced inward from the inner periphery of said housing for diverting the downwardly directed vapor flow in said vapor collection means in an upward direction externally of said vapor collection means; and vapor outlet means disposed in said separation zone externally of said vapor collection means and spaced upward from said vapor diverting means in the flow path of said upward flow of said vapor for receiving and expelling the vapor flow.

4,002,433

HEAT SHIELD FOR A CATALYTIC EMISSION CONTROL DEVICE

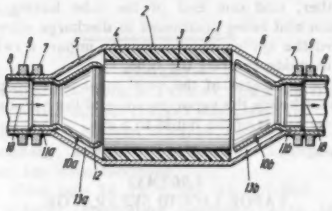
Polat Oser, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Continuation of Ser. No. 452,704, March 19, 1974, abandoned. This application Oct. 28, 1975, Ser. No. 626,293

Claims priority, application Germany, Mar. 23, 1973, 2314465

Int. Cl.² B01J *8/02, 35/04;* **F01N** *3/15*

U.S. Cl. 23—288 FC **4 Claims**



1. In a device for catalytic purification of exhaust gas from an internal combustion engine including:

a. an annular housing having funnel shaped inlet and outlet means arranged at opposite ends thereof, said annular housing having an internal wall surface;

b. monolithic catalyst carrier means arranged within the housing, and

c. annular, elastic support means arranged between the carrier means and the housing, the carrier means being securely mounted in the housing exclusively by the support means which is stressed radially in compression by the housing to mount the carrier means, the inlet and outlet means being adapted to communicate with an exhaust gas line of the engine so that exhaust gas flows through the carrier means entering the exiting through different ends of the carrier means,

the improvement comprising heat shield means disposed within, coupled to and supported by the housing for shielding a portion of said internal wall surface of the housing against heat from exhaust gas flowing therethrough, the heat shield means including a funnel shaped shield member located within at least one of said inlet and outlet means adjacent an end of the carrier means with the larger funnel opening facing said end of the carrier means, without applying any supportive force thereto in the axial direction, at least a portion of the shield member being oriented substantially parallel to and spaced from a portion of said internal wall surface of the housing,

whereby the heat shield means retards thermal expansion of the housing from reducing the radial compression to the point where the carrier means is no longer securely mounted.

4,002,434

PROCESS FOR THE PRODUCTION OF ABRASION RESISTANT PERBORATE MONOHYDRATE

Edmund Simmersbach, late of Willaringen-Egg, Germany (by Ingeborg Simmersbach, heiress), and Artur Schaller, Rheinfelden, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Feb. 17, 1972, Ser. No. 227,307

Claims priority, application Germany, Jan. 25, 1972, 2203285

Int. Cl.² B01J *17/02*

U.S. Cl. 23—293 R **13 Claims**

1. A process for the production of abrasion resistant sodium perborate monohydrate comprising treating preformed sodium perborate monohydrate in a moistening unit by adding water in an amount of 5 to 30 weight % of the sodium perborate monohydrate at a temperature of 20°–90° C. and then drying the monohydrate at a temperature beginning at 40° C. and increasing to a maximum of 90° C.

4,002,435

CLEAR AND STABLE LIQUID FUEL COMPOSITIONS FOR INTERNAL COMBUSTION ENGINES

Edward C. Wenzel, 553 W. Shore Trail, and Henry W. Steinmann, 13 Heighwood Trail, both of Sparta, N.J. 07871

Continuation-in-part of Ser. No. 199,773, Nov. 17, 1971, abandoned, which is a continuation-in-part of Ser. No. 84,507, Oct. 27, 1970, abandoned, which is a continuation-in-part of Ser. No. 56,746, July 20, 1970, abandoned. This application June 30, 1975, Ser. No. 592,083

Int. Cl.² C10L *1/32*

U.S. Cl. 44—51 **6 Claims**

1. A clear, liquid composition stable below the freezing point of water and suitable for use as a fuel in an internal combustion engine, which comprises:

a. a hydrocarbon fuel suitable for use in an internal combustion engine;

b. about 0.1% to about 10% water;

c. about 0.1% to about 20% of an alcohol which is completely soluble in water; and

d. a surface active amount of a combination of surface-active agents consisting of:

i. a mixture of ammonium and sodium oleate;

ii. an organic acid selected from the group consisting of oleic, linoleic, stearic acids, and mixtures thereof; and

iii. an ethylene oxide condensation product.

4,002,436

POLYMER SOLUTION

Desmond Wilfrid John Osmond, Windsor; Norman Douglas Patrick Smith, and Frederick Andrew Waite, both of Farnham Common, all of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 79,701, Oct. 9, 1970, abandoned. This application Apr. 11, 1973, Ser. No. 349,942

Claims priority, application United Kingdom, Oct. 10, 1969, 49834/69

The portion of the term of this patent subsequent to Dec. 7, 1993, has been disclaimed.

Int. Cl.² C10L *1/22*

U.S. Cl. 44—62 **5 Claims**

1. A liquid hydrocarbon jet aviation fuel of flash point at least 90° F suitable for use in gas turbine engined aircraft, and having a reduced tendency to particulate dissemination on being subjected to shock, the fuel containing dissolved therein 0.01 to 1% by weight of an addition polymer of ethylenically unsaturated monomer which is soluble in said hydrocarbon

fuel of molecular weight greater than 10^6 (viscosity average) or of intrinsic viscosity greater than 2.5 dls./gm. in a concentration such that there is molecular overlap of the polymer molecules in the liquid but the viscosity is less than 1 poise at zero shear rate at ambient temperature, the dissolved polymer containing polar groups which form inter-molecular associative bonds arising from electrostatic attraction between polar and/or dipolar charges in the polar groups, the bonds being hydrogen or electrovalent bonds.

4,002,437

DIESEL FUEL COMPOSITION

Willy P. Broeckx, Reet, and Lothar G. Dulog, St. Martens-Latem, both of Belgium, assignors to S.A. Texaco Belgium N.V., Brussels, Belgium

Filed Feb. 27, 1975, Ser. No. 553,712
Int. Cl.² C10L *1/18*
U.S. Cl. 44—66 **1 Claim**

1. A pollution free, anti-wear diesel fuel composition comprising a non-lubricating mixture of hydrocarbons boiling in the range from about 310° to 475° F. containing from about 0.01 to 0.05 weight percent of an additive mixture composed of (A) from 100 to 200 parts by weight of a polymeric acid selected from the group consisting of (1) dimeric acid produced by the condensation of unsaturated aliphatic monocarboxylic acids having between about 16 and about 18 carbon atoms per molecule (2) dimeric acid produced by the condensation of hydroxy-aliphatic monocarboxylic acids having between about 16 and about 18 carbon atoms per molecule, (3) trimeric acids produced by the condensation of unsaturated aliphatic monocarboxylic acids having between about 16 and about 18 carbon atoms per molecule and (4) trimeric acids produced by the condensation of hydroxy-aliphatic monocarboxylic acids having between about 16 and about 18 carbon atoms per molecule, (B) 50 to 150 parts by weight of a normally liquid completely or partially neutral amine salt of an oxo-alkyl acid ester or orthophosphoric acid in which salt esterifying oxo-alkyl group contains 13 to 16 carbon atoms and the amine is an aliphatic hydrocarbon mono-amine of 6 to 24 carbon atoms in which each aliphatic hydrocarbon radical is attached to the nitrogen through a saturated carbon atom, (C) from 5 to 15 parts by weight of an aliphatic ester demulsifier consisting of the alkoxylated product from the reaction of a monocarboxylic acid selected from the group consisting of palmitic acid and oleic acid and ethylene oxide or propylene oxide to a molecular weight ranging from 1000 to about 2000, and (D) an amount of saturated hydrocarbon solvent effective to provide a homogeneous solution of said additive mixture.

4,002,438

ORGANIC CONVERSION SYSTEM

Joseph Fleming, 15925 McDermitt St., Fountain Valley, Calif. 92708

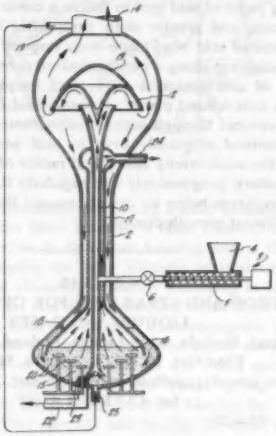
Filed Jan. 22, 1975, Ser. No. 543,176
Int. Cl.² C10J *3/48, 3/56*
U.S. Cl. 48—76 **3 Claims**

1. Apparatus for the pyrolytic conversion of organic waste material into a fuel product comprising:

three generally vertically positioned substantially concentric conduits wherein the innermost conduit is open at both ends and forms a pyrolysis chamber, said pyrolysis chamber being provided with an organic waste material inlet means enabling the introduction of organic waste material into said innermost conduit from outside of said apparatus;

the middle conduit is open at the bottom end and forms a combustion chamber having oxygen inlet means positioned at the bottom thereof, said combustion chamber functioning to enable the regeneration of hard, dense, particulate matter by combustion and to enable heating of said pyrolysis chamber by channelling combustion gases through said combustion chamber along the outside of said pyrolysis chamber into a gas outlet chamber formed at the top end of said conduit closing off said top end said outlet chamber enabling the discharge of said combustion gases out of said apparatus, said innermost conduit extending through said gas outlet to open into the outermost conduit;

said outermost conduit closed at both ends to enclose said innermost and middle conduits and form a collecting chamber, said collecting chamber functioning to enable the recirculation of said hard, dense, particulate matter within said apparatus, said outermost conduit having a



product outlet to enable removal of fuel product from said apparatus, and a char outlet at the bottom thereof to enable the removal of char from the apparatus;

an arcuate shaped static cyclone positioned over the top of said innermost conduit, said cyclone functioning to separate hard, dense, particulate matter exiting said innermost conduit from product gas exiting said innermost conduit;

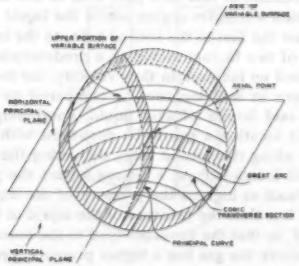
a seal comprising a fluidized bed of said hard, dense, particulate matter and formed between said middle conduit and outermost conduit, said seal functioning to separate product gases from combustion gases.

4,002,439

METHOD OF FORMING AN OPHTHALMIC LENS FOR PRESBYOPIA AND APHAKIA

David Volk, 2460 Fairmount Blvd., Cleveland, Ohio 44106

Division of Ser. No. 322,488, Jan. 10, 1973, abandoned. This application Dec. 23, 1974, Ser. No. 535,519
Int. Cl.² B24B *1/00, 13/04*
U.S. Cl. 51—284 **2 Claims**



1. The method of forming a convex front surface portion of

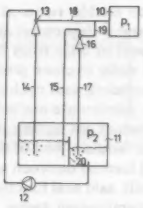
variable curvature for use in the formation of spectacle lenses for correction of presbyopia and aphakia which surface is characterized by having a pair of orthogonal principal planes which intersect said front surface normally at all points, the first of said principal planes, generally horizontal, intersecting said front surface in a great arc, and the second of said principal planes, generally vertical, intersecting said front surface in a principal curve; comprising mounting a workpiece in a holder, causing an abrading tool to cut said workpiece symmetrically on opposite sides of said principal curve while following a path in a plane at right angles to said principal curve and to said second principal plane, and causing the abrading point of said tool to follow a conic pattern of eccentricity zero and greater than zero, after each cut causing movement of said workpiece with respect to said tool by a small increment along a predetermined substantially elliptical portion of said principal curve and keeping said principal curve in said second plane, repeating said cuts while causing said movement through successive increments to follow said predetermined elliptical curve in said second plane while varying the eccentricity and apical radius of curvature of said conic pattern progressively and regularly for successive cuts, said increments being so closely spaced that said workpiece has an almost smooth contour.

4,002,440

METHOD AND APPARATUS FOR OPERATING ON LIQUIDS AND GASES

Risto Saari, Harjula, 2440 Luoma, Finland

Filed Oct. 29, 1974, Ser. No. 518,873
Claims priority, application Finland, Oct. 29, 1973, 3347/73
Int. Cl.² B01D 47/06
U.S. Cl. 55—25 **19 Claims**



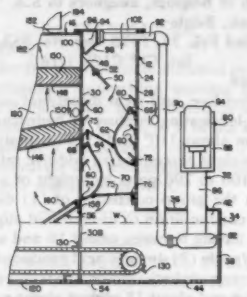
1. In a method for operating on liquids and gases, the steps of providing for a liquid a flow path upwardly along the interior of a first tube from a first body of said liquid and downwardly along the interior of a second tube, which communicates with the first tube and which together with the first tube and a connection therebetween is closed off from the outer atmosphere, to a second body of said liquid, while maintaining a continuous flow of said liquid upwardly along the interior of said first tube, through said connection, and downwardly along the interior of said second tube, while subjecting the liquid, at a location of said flow path near to and including at said connection a transfer region where the liquid flows continuously from the first to the second tube, to the influence of at least one of two factors including a predetermined hydrostatic head and an increase in flow velocity, for reducing the liquid pressure at said location as compared to the liquid pressure at said bodies of said liquid, combining with the liquid at said location a gas to be conveyed with the liquid downwardly along the second tube, delivering the gas to the liquid at said location from a source where the gas is at a pressure at least as high as the pressure of the liquid at said location but less than the pressure of the liquid at said bodies of said liquid, so that the gas is pumped to the second body of said liquid where the gas has a higher pressure, providing for the liquid a second flow path, from one to the other of said bodies of liquid, substantially the same as said first-mentioned flow path, while subjecting the liquid at the said location of said second flow path to the influence of at least one of said factors, and delivering additional gas from said source to the liquid at said location of said second flow path, so that the pumping of the gas is carried out in a plurality of stages.

4,002,441

WASH SECTION FOR AIR-CLEANING DEVICE

Willard Lewis Johnson, 12923 Lincoln Ave., Huntington Woods, Mich. 48070

Filed Mar. 21, 1975, Ser. No. 560,614
Int. Cl.² B01D 47/10
U.S. Cl. 55—226 **18 Claims**



1. An improved wash section in air cleaning apparatus to remove solid particulate matter from a contaminated air stream introduced into the wash section,

said apparatus having, as respective portions thereof and communicating with said wash section,

first means for introducing said contaminated air stream into said wash section at a relatively high input velocity and second means for discharging a wash liquid into said wash section at a relatively low input velocity in comparison with the input velocity of said air stream and into the path of said air stream for intimate intermixing therewith,

the improvement comprising

a housing defining a wash section and having conjoined front, rear and lateral walls, an air stream input opening at the upper end of said housing and a discharge opening adjacent the lower end of said housing through one of said walls, said second means including wash liquid discharge means adjacent and below said air stream input opening, comprising

a wash liquid discharge chamber housing secured to one of said wash section housing walls and having a wash liquid discharge opening at its lower end so that said wash liquid is discharged downwardly therefrom and substantially in a gravitational direction, and a wash liquid baffle plate secured to said one wall adjacent and below said wash liquid discharge opening and extending partially across the cross-sectional area of said wash section housing to deflect wash liquid discharged thereonto into the path of said air stream,

said wash liquid discharge chamber housing, said wash liquid discharge opening and said wash liquid baffle plate extending substantially the entire width of said one wall,

said wash liquid discharge means providing a broad forceful stream of wash liquid in a wide torrent at a relatively low discharge output velocity adjacent and below said air stream input opening to create considerable turbulence with said air stream entering said wash section housing at a relatively high input velocity in the vicinity of and below said baffle plate,

and a pair of baffle members disposed and secured in ven-

turi forming relationship on opposite facing walls of said wash section housing, somewhat below said wash liquid baffle plate and above said wash section housing discharge opening,

a turbulence chamber defined by said wash liquid baffle plate, said wash section housing walls and said venturi forming baffle members for intimate intermixing of said wash liquid and air stream to form a moisture-laden air stream,

means on said opposite facing walls for adjustably and removably securing said baffle members to said wash section housing walls in substantially opposing relationship to form a venturi passage between said baffle members of selectively adjustable and variable capacity,

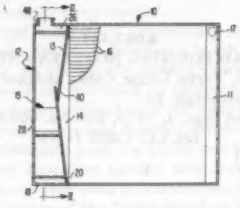
whereby the turbulence of the moisture-laden air stream is substantially increased and more intimate intermixing of said wash liquid and said solid particulate matter is effected adjacent and in said venturi passage to form a volume of moisture covered solid particles in proportion to the measure of turbulence generated in said turbulence chamber and said venturi passage.

4,002,442

EQUALIZING TANK FOR THE VOLUME EQUALIZATION AND THE AIR SEPARATION OF A LIQUID HEAT CARRIER FLOWING THROUGH A CIRCULATORY SYSTEM

Josef Merz, Ostfildern, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Apr. 22, 1975, Ser. No. 570,993
Int. Cl.² B01D *46/42*
U.S. Cl. 55—309 **39 Claims**



37. Equalizing tank apparatus for volume equalization and air separation of a liquid heat carrier flowing through a circulating system, especially for a circulatory system for combustion engine cooling spaces and the like; said apparatus comprising:

tank housing means,

separation chamber means arranged in said housing means,

air chamber means arranged above said separation chamber means,

said separation chamber means being constructed and arranged to form liquid-air separating means and including a plurality of separate separation chambers, a first of said separation chambers including an inlet portion coupled with a separation flow entrance leading from the circulatory system and an outlet portion coupled directly with a second of said separation chambers, said outlet portion being constructed and arranged to permit passage therethrough of at least a substantial portion of the flow of liquid through said first of said separation chambers to said second of said separation chambers,

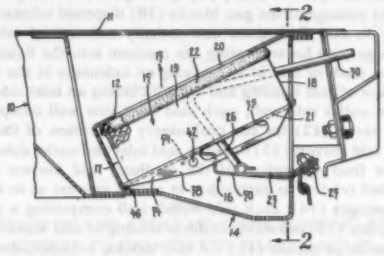
and separate vent connections leading from said air chamber means to each of said first and second separation chambers for accommodating escape of entrapped air from the liquid flowing through said first and second separation chambers to said air chamber means.

4,002,443

AIR FILTER CLAMPING MECHANISM FOR CAB

Leo J. Lorenz, Farmington, Mich., assignor to Massey-Ferguson Inc., Detroit, Mich.

Filed Mar. 31, 1975, Ser. No. 563,942
Int. Cl.² B01D *46/00*
U.S. Cl. 55—357 **7 Claims**



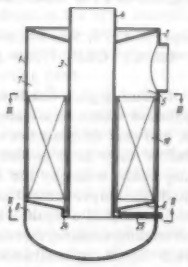
1. An air filter installation including a filter housing, an air inlet aperture in the filter housing, a filter element covering the air inlet aperture in the filter housing and a clamping assembly for clamping the filter element in position in the filter housing, said clamping assembly including at least one blade spring with one end rigidly attached to the filter housing and a free end, at least one floating lever engagable with the filter element, a slot in the floating lever and a cranked rod rotatably attached to the free end of the blade spring and having a portion remote from said blade spring passing through said slot in the floating lever for biasing the floating lever toward the filter element and biasing the filter element toward the air inlet aperture.

4,002,444

VERTICAL SEPARATOR

Lev Nikolaevich Artemov, ulitsa Pravdy, 24a, kv. 44; Anatoly Fedorovich Bakanov, ulitsa Ordzhonikidze, 13, kv. 40; Anatoly Arkadievich Bilyavsky, ulitsa Entuziastov, 12, kv. 1; Vera Evdokimovna Gorodnitsyna, ulitsa Filippova, 4a, kv. 70, all of Podolsk; Evgenia Dmitrievna Elkina, ulitsa Lensoveta, 62, korpus 1, kv. 26, Leningrad; Valery Ivanovich Manaenkov, ulitsa Generala Ermolova, 4, kv. 5, Moscow; Ljudmila Nikolaevna Polyanskaya, ulitsa Mashinostroitelei 28 "b", kv. 58, Podolsk; Jury Leonidovich Sorokin, ulitsa Zapadnaya, 12, kv. 11, Leningrad; Anatoly Zakharovich Taran, ulitsa Entuziastov, 3, kv. 18, Pololsk, and Evgeny Alexeevich Fadeev, Sevanskaya ulitsa, 7, korpus, 1, kv. 64, Moscow, all of U.S.S.R.

Filed Apr. 2, 1975, Ser. No. 564,357
Int. Cl.² B01D *45/04*
U.S. Cl. 55—413 **4 Claims**



1. A vertical separator for separating a liquid - gas medium, comprising: a cylindrical housing (1); a lateral inlet (2) for

admitting the medium; a gas-discharge pipe (3) axially mounted within said housing; a substantially axial annular space (5) being defined between the inner surface of said housing and the outer surface of said pipe; a partition wall (6) dividing said annular space crosswise into a first space (7) for the medium, closer to said inlet, and a second space (8) for the gas, farther away from said inlet, and communicating with the internal space of said pipe; openings (9) in said partition wall for passage of the gas; blocks (10) disposed substantially axially in said first space and radially outward of said gas discharge pipe for separating the medium into the liquid and the gas, each of said blocks having an extension in the radial direction of said housing and each including an inlet side wall and an outlet side wall, each said inlet side wall comprising guide vanes (12) for the preliminary separation of the medium, said louvers (13) between said inlet and outlet side walls for the final separation of the medium, said louvers being mounted relative to each other in such a manner as to define gas passages (14); each said outlet wall comprising a perforated plate (15) providing uniform loading of said louvers; and gas discharge means (11) for said blocks, accommodated in spaces between adjacent blocks and embracing said openings for the gas passage.

4,002,445

METHOD OF FORMING AND SIZING GLASS FIBERS

Roy R. Graham, Lexington, N.C., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 464,861, April 29, 1974, Pat. No. 3,932,193. This application Sept. 2, 1975, Ser. No. 609,252

Int. Cl.² C03C *25/02*

U.S. Cl. 65—3 C **5 Claims**

4. A method of forming glass fibers which comprises drawing glass filaments from molten cones of glass at a high rate of speed; applying to the filaments during formation an aqueous glass fiber size comprising a starch, a lubricant, a textile softener, and a nonionic wetting agent, wherein the size contains 150 to 100 percent by weight of said nonionic wetting agents based on the weight of said lubricant and winding the strand on a rapidly rotating forming tube.

4,002,446

GLASS BEAD FORMING METHOD

Joseph J. Hammel, Pittsburgh, Pa., and Eugene J. Cone, Yorba Linda, Calif., assignors to PPG Industries, Inc., Pittsburgh, Pa.

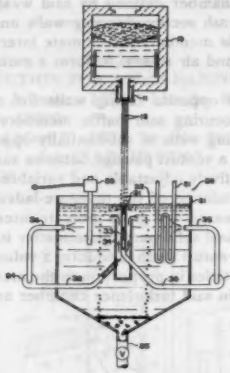
Filed Sept. 2, 1975, Ser. No. 609,631

Int. Cl.² C03B *19/10*

U.S. Cl. 65—21 **5 Claims**

1. In the method of forming glass beads wherein a stream of molten glass is established which dissociates into falling droplets of molten glass, and said droplets are caught in a bath of quenching liquid before they have cooled to a temperature below their softening point, whereby the beads flatten upon impact with the liquid, the improvement comprising:

using as the quenching liquid a liquid whose viscosity is an inverse function of temperature, thermally controlling the viscosity of said liquid by extracting heat from the quenching bath with cooling means, and thereby modulating the viscosity of the liquid to maintain the rate of heat exchange from the beads to the liquid below a predetermined maximum rate so that the beads remain at a temperature above their softening point for a sufficient period of time after entering the quenching liquid to



enable their assuming a substantially regular spherical shape.

4,002,447

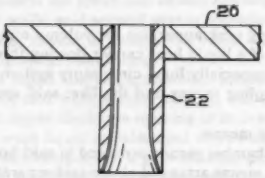
GLASS BEAD FORMING NOZZLES AND METHOD

Eugene J. Cone, Yorba Linda, Calif., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 2, 1975, Ser. No. 609,632

Int. Cl.² C03B *19/10*

U.S. Cl. 65—21 **4 Claims**



1. A method for forming beads of glass of a predetermined cross sectional size and shape comprising:

establishing a flow of molten glass through an opening having a linearly extending first portion which is of uniform cross section and a second portion which is progressively larger in cross section, and

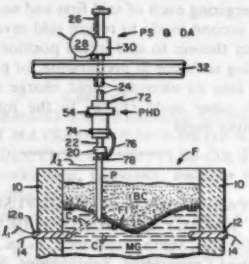
alternately flowing the molten glass through said opening at a first velocity sufficient to cause a jet of glass issuing from said opening to assume the cross section of said first portion and at a second velocity sufficient to cause a stream of glass to issue from the opening with the cross section of said second portion, wherein said jet dissociates into freely falling beads of a first predetermined size and said stream dissociates into freely falling beads of a second, larger predetermined size.

4,002,448

METHOD AND APPARATUS FOR DETERMINING THE ELEVATION OF THE FUSION INTERFACE IN AN ELECTRIC GLASS MELTING FURNACE

James L. Griffith, Painted Post, and Paul F. Spremulli, Corning, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Apr. 29, 1976, Ser. No. 681,459
Int. Cl.² C03B 5/24
U.S. Cl. 65—29 4 Claims



1. In combination with an apparatus for indicating various elevations of a fusion interface between a batch cover and a bath of molten glass having electrical heating currents supplied thereto, including an electrical probe of rod form having a bottom tip for penetrating the batch cover; means for continuously driving the probe vertically downwardly into the batch cover; and means for detecting flow of electrical current from the probe, thus indicating when the probe has penetrated into the molten glass through the fusion interface, the improvement comprising pneumatic means for intermittently hammering the probe into the said batch cover simultaneously with the continuous driving thereof.

3. An improved method of determining the location of a portion of a fusion interface between a batch cover and molten glass within an electrically heated furnace of the type including the steps of, providing an electrical probe at a selected horizontal and vertical position relative to the batch cover; continuously vertically downwardly driving the probe, to thereby continuously push the probe downwardly into the batch cover; and detecting current flow from the probe to determine when the probe has penetrated the fusion interface, whereby the elevation of the fusion interface is ascertainable; from the vertical displacement of the probe from its initial selected vertical position; the improvement comprising; while continuously downwardly pushing the probe, simultaneously cyclically hammering the probe into the batch cover.

4,002,449

METHOD OF MELTING LASER GLASS COMPOSITIONS

Louis Spanoudis, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed May 21, 1975, Ser. No. 579,300
Int. Cl.² C03B 5/22
U.S. Cl. 65—32 13 Claims

1. A method of melting laser glass compositions that includes double melting steps, the method comprising the steps of:

I. melting the glass composition in a ceramic container in an oxidizing atmosphere in which the partial pressure of oxygen is greater than about 10^{-3} atmospheres for a time sufficient to oxidize the ingredients of the glass composition to a higher valence state; and

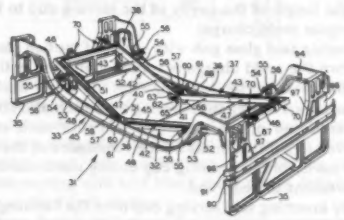
II. melting the resultant melt of Step I in a platinum container containing at least about 50% by weight of platinum in a reducing atmosphere in a buffered gas mixture of the group consisting of CO/CO_2, H_2/H_2O, CO_2/NH_3, CO_2/H_2, H_2O/NH_3 and H_2O/CO and mixtures thereof in which the partial pressure of oxygen is less than about 10^{-3} atmospheres for a time sufficient to obtain homogenization of the glass with stirring and still have the ingredients of the glass composition in an oxidized state to thereby produce a laser article substantially free from detrimental lower valence state ingredients, such as Fe^{++}, and a minimum of platinum inclusions in the glass.

4,002,450

METHOD OF AND APPARATUS FOR BENDING GLASS SHEETS TO RELATIVELY SHARP ANGLES

Harold E. Hamilton, Toledo; Paul V. Pastorek, Rossford; Floyd T. Hagedorn, Oregon, and Robert G. Revells, Toledo, all of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Mar. 14, 1975, Ser. No. 558,288
Int. Cl.² C03B 23/02
U.S. Cl. 65—107 21 Claims



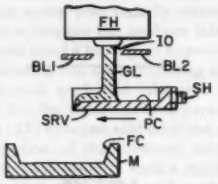
1. A method of bending a glass sheet to a relatively sharp angle comprising: applying a first electrically conducting path to at least one surface of the glass sheet along the line about which it is desired to bend the sheet, applying a second electrically conducting path to said surface extending from the opposite end of said path in opposite directions along first opposite marginal edge portions and then along angularly related second opposite marginal edge portions and terminating at ends therealong disposed inwardly of said first opposite marginal edge portions of said glass, introducing an electrical current into said second electrically conducting path along said second opposite marginal edge portions whereat the least amount of glass displacement occurs during the subsequent bending operation, said current being transmitted along said first opposite marginal edge portions to said first electrically conducting path to heat the sheet in the area immediately adjacent said first path to a temperature above the bending point of the glass, and causing said sheet to bend sharply along said first electrically conducting path.

5. Apparatus for bending a glass sheet to a relatively sharp angle comprising: a frame, an outline type bending mold supported on said frame and having a substantially continuous shaping surface formed thereon and conforming to the margin of the glass sheet to be bent, electrically conducting means mounted on said frame and including oppositely disposed electrical contacts mounted on the mold in spaced relation to said shaping surface and engageable with the opposite marginal edge portions of the glass sheet supported on said mold, means maintaining said contacts in engagement with said glass sheet marginal edge portions upon movement of said glass sheet during the bending thereof, and means coupling said electrical conducting means to a source of electrical energy.

4,002,451
GLASS GOB HANDLING

Warren R. Knapp, Addison, and Richard L. West, Sr., Corning, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Aug. 22, 1975, Ser. No. 606,748
Int. Cl.² C03B 5/34
U.S. Cl. 65—127 8 Claims



1. The method of receiving a gob of a relatively viscous molten glass issuing from the outlet orifice of a forehearth and preforming such gob into a relatively elongate mold charge and then delivering such charge to the forming cavity of a forming mold with the virgin surface of the charge facing downwardly in such cavity, such method comprising;

A. longitudinally and slowly moving a serving cup having an elongate cavity beneath said outlet orifice so that said gob as it issues such orifice is spread along a substantial part of the length of the cavity of the serving cup to form said elongate mold charge;

B. severing said glass gob with a pair of molten glass shears before the mold charge is spread along the entire length of the cavity of the severing cup, the lower blade of said glass shears during the severing operation also striking the severed end of the glass gob to cause such end to be moved in a direction to fill the remainder of the length of the cavity of the severing cup during continuation of said movement thereof; and

rapidly inverting said serving cup over the forming cavity of said forming mold at a speed sufficient to deliver said mold charge to the forming cavity by gravity with the virgin side of such mold facing downwardly in such cavity.

4. Apparatus for performing into an elongate mold charge a gob of molten glass issued from the outlet orifice of a forehearth and delivering the preformed mold charge to the forming cavity of a forming mold located below but offset from said orifice, such delivery being performed with the virgin side of the mold charge facing downward in said forming cavity, such apparatus comprising, in combination;

A. a support plate horizontally disposed below and adjacent to said outlet orifice;

B. a shaft rotatably and longitudinally slidably supported adjacent the upper surface of said support plate,

C. a longitudinal serving cup embodying an elongate cavity having an initial end disposed beneath said outlet orifice with one end of such cup affixed to a first end of said shaft,

D. first motor means coupled with the second end of said shaft for longitudinal movement of such shaft and thereby of said serving cup,

E. second motor means connected with said shaft for rotation thereof and thereby inversion of said serving cup,

F. a pair of molten glass shears between said outlet orifice and said cavity of said serving cup, and

G. control means actuated in synchronism with the issuance of a gob of molten glass from said outlet orifice for:

I. energizing said first motor means in a first mode to slowly longitudinally move said serving cup and thereby said cavity therein beneath said outlet orifice to thereby receive said gob as it issues from said orifice and spread the gob along the length of said cavity to form said preformed mold charge;

II. actuating said shears to shear said gob from the parent stream of molten glass issued from said orifice, the lower blade of such shears striking the severed end of the gob to move such end in the direction opposite to the direction of movement of said serving cup during slight continuation of such movement;

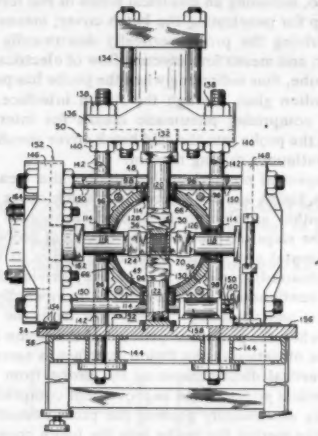
III. energizing said second motor means in a first mode to rapidly rotate said shaft and thereby invert said serving cup to deliver the preformed mold charge to said cavity of said forming mold with the virgin side of such mold charge facing downwardly in such cavity; and

IV. energizing each of said first and second motor means in a second mode to return said severing cup and said cavity therein to said initial position thereof and reinverting such cup in preparation for preforming another gob into an elongate mold charge and for delivering such other mold charge to the forming cavity of a forming mold.

4,002,452
APPARATUS FOR MAKING FUSED FIBER ENERGY-CONDUCTING DEVICES

Ethan C. Hopkins, South Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

Division of Ser. No. 604,455, Dec. 23, 1966. This application May 23, 1968, Ser. No. 797,287
Int. Cl.² C03B 23/20
U.S. Cl. 65—152 6 Claims



1. Apparatus for making permanently vacuum tight fused bundles of glass fibers comprising a base, a furnace fixed to said base, a stand within said furnace including a first heating block adapted to receive a bundle of fibers thereupon, a rectangular die insertable longitudinally into and removable from said furnace for supporting therewithin said bundle of fibers on said first heating block, said die including a platen movable thereinto against a side of said bundle, a second heating block arranged to engage said platen, third and fourth heating blocks arranged to engage respective opposite sides of said die and fifth and sixth heating blocks arranged to engage opposite ends of said die, a system of longitudinally movable plungers extending through the top, opposite sides and ends of said furnace to which said second through sixth heating blocks are affixed, fluid operated high pressure cylinder means operatively interconnected to said plungers for moving the same and the heating blocks respectively affixed thereto toward said die, said cylinder means being disposed externally of said furnace, a system of rods of high tensile strength supporting said cylinders whereby, when said cylinders are actuated to move said heating blocks toward and compressively against

said die, forces inherently reacting equally and oppositely to those applied to said die are absorbed tensilely in said system of rods independently of and without affect upon the structure of said furnace.

4,002,453

ARRANGEMENT FOR FEEDING GOBS OF PLASTICIZABLE MATERIAL IN MOLDS OF A MACHINE FOR THE PRODUCTION OF BOTTLES OR THE LIKE

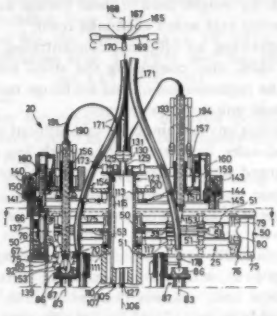
Kurt Becker, Obernkirchen, Germany, assignor to Hermann Heye, Obernkirchen, Germany

Continuation-in-part of Ser. No. 197,076, Nov. 9, 1971, Pat. No. 3,803,877, which is a division of Ser. No. 716,196, March 26, 1968, Pat. No. 3,622,305. This application Oct. 10, 1973, Ser. No. 405,047

Claims priority, application Germany, Apr. 1, 1967, 62338

Int. Cl.² C03G 5/30

U.S. Cl. 65—207 14 Claims



1. In a machine for the production of bottles and similar hollow articles from plasticizable material, a combination comprising means rotatable about a substantially vertical axis; a plurality of molds carried by said rotatable means radially spaced from said axis and circumferentially spaced from each other, each of said molds having a vertical axis, a plunger for each mold carried by said rotatable means reciprocable along the axis of the respective mold between an active position in which a lower end portion of the plunger extends into the respective mold and an upwardly withdrawn inactive position; means located at a higher elevation than said molds and having a vertically downwardly extending outlet for successively supplying gobs of plasticizable material; and means for feeding such gobs seriatim from said gob supplying means into said molds during movement of the latter with said rotatable means, said feeding means comprising a plurality of continuous feed channels, one for each mold, and each having an upper and a lower end, and support means for each of said feed channels carried by said same rotatable means for movement therewith about said vertical axis and connected to the respective feed channel for periodically aligning the upper end of the respective feed channel with said outlet end of said gob supplying means for receiving a gob from the latter and for periodically aligning the lower end of the feed channel with the respective mold for feeding the received gob into said mold while the plunger coordinated with said mold is in said upwardly withdrawn inactive position.

4,002,454

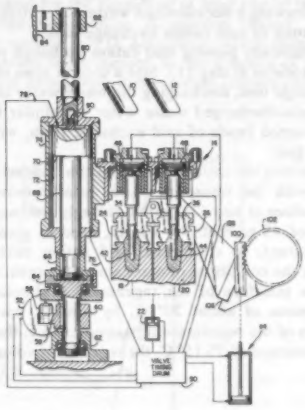
GLASSWARE FORMING MACHINE OF THE I. S. TYPE FOR UPRIGHT PRESS AND BLOW PROCESS

George E. Rowe, deceased, late of Wethersfield, Conn., by Selma S. Rowe, executrix, assignor to Emhart Industries, Inc., Hartford, Conn.

Division of Ser. No. 545,777, Jan. 31, 1975. This application Nov. 26, 1975, Ser. No. 635,666

Int. Cl.² C03B 9/00, 11/00, 11/06

U.S. Cl. 65—229 5 Claims



1. In a glassware forming machine having a blank mold station, the improvement comprising:

a. structure defining at least two blank mold cavities for receiving gobs of glass dropped downwardly therein,

b. partible neck ring mold structures including neck ring molds mating with said blank mold cavity defining structure at the blank station,

c. parison forming plungers for insertion downwardly into said blank mold cavities,

d. support means for said plungers including a vertically oriented fluid motor with a vertically movable part,

e. a plunger supporting arm carried by said movable fluid motor part,

f. individual fluid motor means associated with each plunger, each individual fluid motor means having a first part mounted in said supporting arm and a second part movable with respect to the first and connected to an associated plunger, and

g. means for moving said plunger supporting arm horizontally between an active position wherein said plungers are located above the blank mold cavities and an inactive position to one side thereof to permit said gobs to be so dropped into the blank mold cavities.

4,002,455

PROCESS FOR TREATING AND RECOVERING WASTE WATER FROM THE FERTILIZER MANUFACTURE

Nicolae Mihai Arion, Bucharest, Romania, assignor to Institutul de Proiectari Pentru Industria Chimica Anorganica si a Ingrasamintelor, Bucharest, Romania

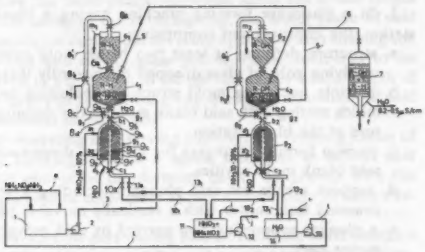
Continuation of Ser. No. 474,020, May 28, 1974, abandoned, which is a continuation-in-part of Ser. No. 313,091, Dec. 7, 1972, abandoned, which is a continuation of Ser. No. 80,019, Oct. 12, 1970, abandoned. This application July 23, 1975, Ser. No. 598,361

Int. Cl.² B01D 15/06

U.S. Cl. 71—1 4 Claims

1. A continuous process for treating and recovering an ion containing waste water from the manufacture of fertilizers with nitrogen and others, with ion exchange resins, by portions, comprising

1. ascendent flowing a stream of said waste water through a first fixing zone of a cation exchange unit, of a loop system, containing therein a compacted bed of strongly acidic cation exchange resin, of styrene-divinyl-benzene type, with high cross-linking degree, having 16–20% divinyl-benzene, sulphonated at 100° C, in beads, macroporous, whereby the stream of waste water with cations, flowing through said first zone of said cation exchange unit, contacts said cation exchange resin and exchanges the cations in the stream of waste water for the hydrogen ions of the cation exchange resin;
2. withdrawing a decationized waste water stream from said first zone of said cation exchange unit;
3. hydraulically passing said cation exchange resin, loaded with cations at step (1), into a second zone of said cation exchange unit, discharging the waste water and removing any non-discharged waste water remainder between the compacted beads of said exchange resin, with a flow of inert gas;
4. contacting the cation exchange resin, loaded with cations and with the transport waste water removed from its interstices at step (3), with a strongly concentrated nitric acid of 45 to 60%, by weight, used in great excess, as regenerant, to regenerate said cation exchange resin, under the conditions of maintaining the resin temperature at the interface of the regenerant acid/resin bead at a maximum of about 20° C, by suitably correlating the values of the regeneration parameters, i.e. the regenerant temperature of 0°–15° C, the regenerant volume of 10–30



times the resin bulk volume, the circulating bulk velocity of the regenerant of 10–50 m/h, and the thickness of the resin bed of a maximum of 0.600 m;
5. withdrawing an effluent strongly concentrated in nitric acid and with the eluated cation salts from the regeneration of said exchange resin, at step (4), from said cation exchange unit;
6. removing any remainder of said strongly concentrated effluent, from step (5), which has remained non-discharged in the interstices between the beads of said exchange resin, with a flow of inert gas;
7. rinsing the regenerated cation exchange resin from step (6) with cooled rinsing water;
8. hydraulically passing said cation exchange resin, rinsed at step (7), into a third loosening zone of said cation exchange unit, wherein fine resin particles, which have resulted in steps (1)–(7) are eliminated, in an ascendent water flow, said fine particles being eliminated by overflowing, drawn out by the loosening water;
9. hydraulically passing said cation exchange resin, loosened by water at step (8), into a fourth feeding zone of said cation exchange unit, wherein the transport water is then removed by overflowing, while the resin is compacted;
10. hydraulically passing said cation exchange resin, compacted at step (9), from the feeding zone, into the first cation fixing zone of said cation exchange unit, at step (1), and discharging therefrom the hydraulic transport water;
11. and repeating the same cycle of steps (1)-(10), in said cation exchange unit, as long as desired;
12. ascendent flowing the stream of waste water, decationized in step (1) and withdrawn in step (2), through a first fixing zone of an anion exchange unit, of a loop system, containing therein a compacted bed of middle basic anion exchange resin, of polyacrylic type, in beads, macroporous, whereby the stream of decationized waste water with anions, flowing through said first zone of said anion exchange unit, contacts said anion exchange resin and exchanges the anions in the stream of decationized waste water for the hydroxyl ions of an anion exchange resin;
13. withdrawing a stream of demineralized water from said first zone of said anion exchange unit;
14. hydraulically passing said anion exchange resin, loaded with anions at step (12), into a second zone of said anion exchange unit, discharging the demineralized water and removing any non-discharged dimineralized water remainder between the compacted beads of said anion exchange resin, with a flow of inert gas;
15. contacting the anion exchange resin, loaded with anions and with the water removed from its interstices at step (14), with strongly concentrated ammonia solution of 18 to 25%, by weight, used in small excess, as regenerant, to regenerate said anion exchange resin;
16. withdrawing an effluent, concentrated in the eluated anion salts, also containing the small ammonia excess, from the regeneration of said exchange resin at step (15), from said anion exchange unit;
17. removing any remainder of said effluent concentrated in eluated salts, from step (16), which has remained non-discharged in the interstices between the beads of said exchange resin, with a flow of inert gas;
18. rinsing the regenerated anion exchange resin from step (17) with rinsing water;
19. hydraulically passing said anion exchange resin, rinsed at step (18), into a third loosening zone of said anion exchange unit, wherein fine resin particles which have resulted in steps (12)–(19), are eliminated, in an ascendent water flow, said fine particles being eliminated by overflowing, drawn out by the loosening water;
20. hydraulically passing said anion exchange resin, loosened by water at step (19), into a fourth feeding zone of said anion exchange unit, wherein the transport water is removed then by overflowing, while the resin is compacted;
21. hydraulically passing said anion exchange resin, compacted at step (20), from the fourth feeding zone into the first anion fixing zone of said anion exchange unit, at step (12), and discharging therefrom the hydraulic transport water;
22. and repeating the same cycle of steps (12)–(21) in said anion exchange unit, as long as desired;
23. mixing said effluent strongly concentrated in nitric acid and with the eluated cation salts, from step (5), with said effluent concentrated in the eluated anion salts, from step (16), and directly introducing the resulting mixed effluent at a suitable stage in the manufacture process of fertilizers with nitrogen and others, wherein there are directly reclaimed both the excess acid and the contained salts; and
24. circulating the demineralized water flow, from step (13), through ion exchange resins, in a mixed bed, to remove any escaped cations and anions, and utilizing the effluent as highly demineralized water.

4,002,456

PLANT-GROWTH PROMOTING AGENT WHICH IS PROVIDED WITH TRACE ELEMENTS AND WHICH IS SUITED FOR USE IN ULTRA-LOW-VOLUME APPLICATIONS

Willem Maas, Weesp, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 3, 1975, Ser. No. 554,970

Claims priority, application Netherlands, Mar. 8, 1974, 7403129

Int. Cl.² C05G *3/00*

U.S. Cl. 71—3 8 Claims

1. A plant growth promoting composition particularly adapted for use in U.L.V. applications, said composition comprising a solution in a solvent comprising N-methylpyrrolidene of 5–40 g per 100 ml of at least 1 micronutrient selected from the group consisting of the chlorides of the trace elements and boric acid and 1–15 g per 100 ml of a nitrogen source selected from the group consisting of acetamide and formamide.

4,002,457

SOIL CONDITIONERS AND FERTILIZERS FROM SPENT SULFITE LIQUOR

Karl David Sears, and Franklin Willard Herrick, both of Shelton, Wash., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Continuation of Ser. No. 498,753, Aug. 19, 1974, abandoned. This application Mar. 11, 1976, Ser. No. 666,399

Int. Cl.² C05F *7/02*

U.S. Cl. 71—25 10 Claims

1. A process for preparing a nitrogen containing water insoluble product useful as a soil conditioner comprising the following two sequential steps:

said first step consisting essentially of heating acidic spent sulfite liquor in the open atmosphere at a temperature of from 170° to 260° C. to form a partially pyrolyzed water insoluble material, and

said second step consisting essentially of reacting ammonia with said water insoluble material at a temperature of from 170° to 260° C. to produce a water insoluble product containing substantial amounts of organic combined nitrogen.

4,002,458

CONTROLLED RELEASE CAPSULES

David A. Hofacker, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 196,807, Nov. 8, 1971, which is a continuation-in-part of Ser. No. 823,164, May 8, 1969, abandoned. This application July 30, 1975, Ser. No. 600,314

Int. Cl.² C05G *1/00, 3/02*

U.S. Cl. 71—27 14 Claims

1. A capsule comprising a liquid fill and a microporous capsule wall, said microporous capsule wall comprising a dispersed solid phase comprising a first material and a continuous solid phase comprising a second material, said first and second materials being miscible and capable of forming a single phase when both of said materials are in a liquid state, but being capable of forming separate phases upon being cooled to a solid state, the volume contraction ratio being at least about 1.2, said first material being present in a quantiy sufficient to provide micropores which extend completely through said capsule wall, said liquid fill comprising an active ingredient selected from the group consisting of pesticides and fertilizers.

4,002,459

GERMINATION FACTORS

Alan W. Johnson, and Gerald Rosebery, both of Brighton, England, assignors to International Development Research Center, Ottawa, Canada

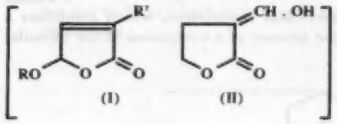
Filed Apr. 8, 1975, Ser. No. 566,098

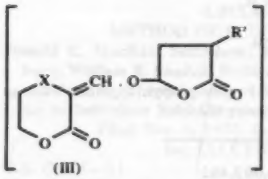
Claims priority, application United Kingdom, Apr. 18, 1974, 16990/74

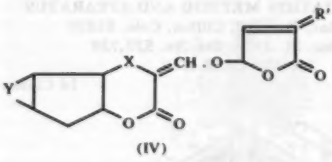
Int. Cl.² C07D *407/12*

U.S. Cl. 71—88 18 Claims

1. A method for the control of at least one of the parasitic weeds, *Striga hermonthica*, *S. asiatica* (lutea); *Orobanche crenata*, *O. ramosa* and *O. aegyptiaca*, which comprises contacting dormant seeds thereof, in the absence of an actively growing host plant, with a compound corresponding to the formula:







wherein R′ is H or C_1 to C_8 alkyl, X represents a single bond or a $—CH_2—$ linkage, and Y represents two hydrogen atoms, and additional bond or an epoxy group.

4,002,460

TRIAZINE-ANTIDOTE COMPOSITIONS AND METHODS OF USE FOR COTTON

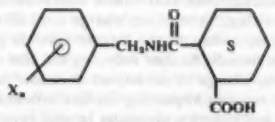
Ferenc M. Pallos, Walnut Creek, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 450,949, March 13, 1974. This application Apr. 10, 1975, Ser. No. 566,652

Int. Cl.² A01N *9/22*

U.S. Cl. 71—93 7 Claims

1. An herbicide composition comprising a mixture of an effective amount of a triazine herbicide and an antidotally effective amount of an antidote compound therefor corresponding to the formula



in which X is fluorine, chlorine, bromine or trifluoromethyl, and *n* is an integer from 1 to 3, inclusive, wherein said antidote compound is present in an amount ranging between about

0.01 to about 15 parts by weight for each part by weight of triazine herbicide.

4,002,461
SUBSTITUTED 2-AZABICYCLOALKANES AS SELECTIVE HERBICIDES

Elmar Sturm, Aesch, and Christian Vogel, Binningen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

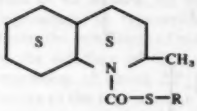
Division of Ser. No. 417,303, Nov. 19, 1973, Pat. No. 3,936,458, which is a continuation-in-part of Ser. No. 52,986, July 7, 1970, abandoned. This application Nov. 7, 1975, Ser. No. 630,057

Claims priority, application Switzerland, July 16, 1969, 10833/69; June 11, 1970, 8773/70

Int. Cl.² A01N 9/22

U.S. Cl. 71—94 **6 Claims**

1. A selective herbicidal composition which comprises a herbicidally effective amount of a compound of the formula



wherein R is ethyl, n-propyl or isopropyl, together with an agriculturally acceptable carrier therefor.

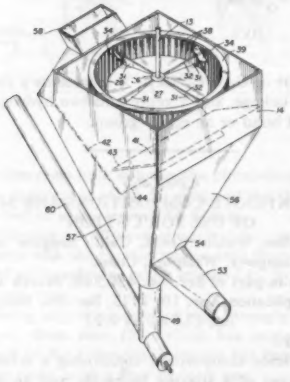
4,002,462
ORE BENEFICIATION METHOD AND APPARATUS

Chesford M. Maddox, Box 213, Clifton, Colo. 81520

Filed Dec. 31, 1974, Ser. No. 537,739

Int. Cl.² C22B 1/00

U.S. Cl. 75—1 R **14 Claims**



1. A method for the beneficiation of sedimentary type ores wherein the gangue materials have a characteristic grain size that is larger than the particle size for values constituents of the ore and harder than said values constituents comprising crushing and sizing the total ore charge until all materials are of a size corresponding to the largest particle grain size for said gangue materials, further reducing the size of the largest particles of the charge in an impact-abrasion zone by introducing forces assuring impacting contact between the charged ore particles and reaction elements in said zone, introducing an initial fluid flow directed through said impact-abrasion zone to carry the materials and fluid away from said zone, interposing guide elements at positions away from said zone in the directed flow path from said zone to intercept and divert said materials and initial fluid whereby the materials are spread and distributed as they pass said guide element to provide a curtain type flow pattern moving away from said guide elements in a primary direction, and subsequently introducing a secondary cross-current fluid input that intercepts the movement pattern for said materials and initial fluid while moving along said primary direction, said secondary cross-current fluid input being of regulable intensity whereby materials of the smaller particle size are separated from said primary direction movement pattern and are entrained for movement along a secondary flow path as energized by said secondary fluid flow.

4,002,463
UPGRADING THE NICKEL CONTENT FROM LOW GRADE NICKEL LATERITIC IRON ORES

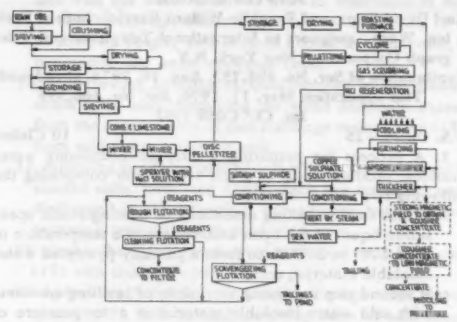
Antonios Nestoridis, Athens, Greece, assignor to Financial Mining - Industrial and Shipping Corporation, Athens, Greece

Filed Mar. 25, 1976, Ser. No. 670,224

Claims priority, application Greece, Apr. 4, 1975, 6410

Int. Cl.² C22B 1/08

U.S. Cl. 75—1 R **9 Claims**



1. A process of upgrading nickel from nickel lateritic iron ore having an iron content by weight of over 10%, silica of over 25% and a nickel content of at least 0.5%, comprising, grinding the ore, thoroughly mixing the ground ore with calcium carbonate, calcium sulphate and coke, spraying the mixed ore with a solution of sodium chloride and making pellets therefrom, drying the pellets, heating at a temperature not greater than 1050° C for up to 90 minutes, roasting at the above temperature for a predetermined period of time so as to convert all the nickel from the ore to a metalic condition in a neutral or a slightly reducing atmosphere, grinding the roasted pellets in a water medium, and adjusting the density of the pulp resulting from grinding for a subsequent process to obtain a concentrate by one of a flotation and a magnetic separation treatment so as to thereby obtain a rich nickel concentrate.

7. A process of upgrading nickel from nickel lateritic iron ore having an iron content by weight of over 10%, silica of over 25% and a nickel content of at least 0.5%, comprising, grinding the ore, thoroughly mixing the ground ore with sodium chloride gypsum and coke breeze, heating the mixed ore at a temperature not greater than 1050° C for up to 90 minutes, roasting at the above temperature for a predetermined period of time so as to convert all the nickel from the ore to a metallic condition in a neutral or a slightly reducing atmosphere, grinding the roasted mixture in a water medium, and adjusting the density of the pulp resulting from the grinding for a subsequent process to obtain a concentrate by one of a flotation and a magnetic separation treatment so as to thereby obtain a rich nickel concentrate.

4,002,464

METHOD OF AND APPARATUS FOR TRANSPORTING OF METAL FIBERS

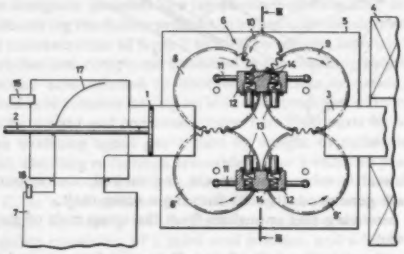
Walther Dawihl, Illinge, Saar, and Walter Eicke, Scheidt, both of Germany, assignors to Klockner-Werke AG, Duisburg, Germany

Continuation-in-part of Ser. No. 568,026, April 14, 1975, Pat. No. 3,955,962. This application July 17, 1975, Ser. No. 596,739

Claims priority, application Germany, Apr. 13, 1974, 2418235; July 25, 1974, 2435802

Int. Cl.² B22F 9/00; H01F 1/06

U.S. Cl. 75—.5 AA 19 Claims



1. A method of producing metal fibers in a magnetic field, comprising the steps of generating magnetic flux lines which extend normal to a planar supporting surface located in an enclosed space; feeding metallic substances into said enclosed space for travel lengthwise of said flux lines and normal to said supporting surface; heating said space to a decompostion temperature at which said substances undergo thermal decomposition and liberate metal atoms which agglomerate under the influence of said flux lines on said supporting surface and form thereon metal fibers which project from the supporting surface in direction normal thereto; moving said supporting surface in said direction of travel; engaging the metal fibers upstream of said supporting surface; and transporting the metal fibers in said direction of travel during continued formation and elongation of said metal fibers.

4,002,465

PROCESS FOR CONTINUOUSLY HEATING AND MELTING PREREDUCED IRON ORES

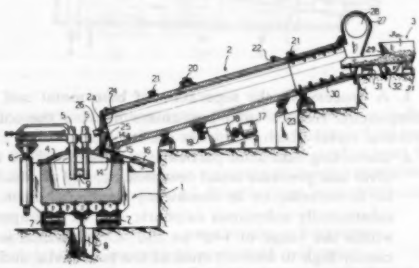
Ugo Brusa, Via Borgnis, Domodossola, Italy

Filed Apr. 9, 1975, Ser. No. 566,393

Claims priority, application Italy, Apr. 16, 1974, 68207/74

Int. Cl.² C21C 5/52

U.S. Cl. 75—11 2 Claims



1. Process for continuously preheating and melting at least substantially pre-reduced iron ores, which comprises in combination:

a. continuously introducing at least substantially pre-reduced iron ore into a rotary, inclined heating zone at the upper end thereof;

b. rotationally moving said ore from said upper end of said heating zone to the lower end thereof;

c. discharging said ore from said lower end of said heating zone into a melting zone abuttingly juxtapositioned with said lower end;

d. introducing hot flue gases from said melting zone into said lower end to heat in a reduced atmosphere said pre-reduced ore countercurrently to its movement;

e. additionally heating said hot flue gases at said lower end by an auxiliary heating means to increase the heat delivered to said heating zone;

f. lowering the rate of travel of said ore in said heating zone by means of a plurality of ribs positioned in the upper portion of said heating zone, whereby the residence time of said ore in said heating zone is increased; and

g. discharging from said melting zone at predetermined intervals a portion of the ore melted therein, thus leaving in the said melting zone a predetermined amount of molten ore to form a bath onto which said pre-heated ore is discharged.

4,002,466

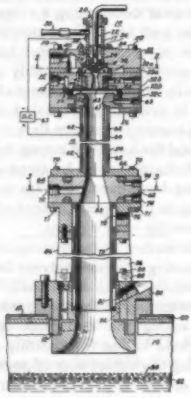
METHOD OF REDUCING ORES

Donald R. MacRae, Bethlehem; Richard G. Gold, Coopersburg; William R. Sandall, Bethlehem; Charles D. Thompson, and Peter G. Cheplick, both of Bethlehem, all of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Nov. 3, 1975, Ser. No. 627,993

Int. Cl.² C21C 5/52

U.S. Cl. 75—11 5 Claims



1. A method of reducing metal oxides in a plasma arc torch comprising a cathode and an anode having two ends, said method comprising:

a. supplying a swirling vortical stabilizing gas stream adjacent to said cathode and said anode;

b. introducing into said torch, between the ends of said anode, solid particles comprising said metal oxides, in a direction such that said particles combine with said gas stream to form a vortical path swirling in the same direction as said stabilizing gas stream, and establishing an arc between said cathode and said anode, said arc providing sufficient heat to convert said metal oxides into a film of material on the wall of said anode;

c. reducing said metal oxides by providing a reductant in contact with them during the formation of said film and thereafter; and

d. collecting the effluent from said torch in a receiving vessel.

4,002,467

METHOD FOR RECOVERING REACTION GASES FROM STEEL CONVERTERS WHICH ARE BOTTOM BLOWN WITH OXYGEN AND COOLED WITH HYDROCARBONS

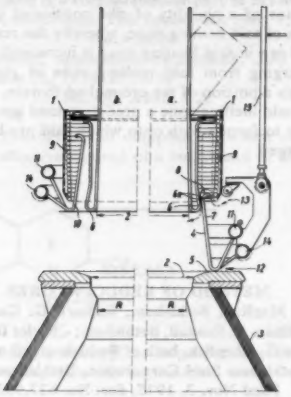
Kurt Baum, Essen, Germany, assignor to Verfahrenstechnik Dr.-Ing. Kurt Baum, Essen, Germany

Filed Oct. 15, 1974, Ser. No. 514,364

Claims priority, application Germany, Jan. 30, 1974, 2404288

Int. Cl.² C21C *5/38*

U.S. Cl. 75—60 2 Claims



1. In a method for recovering reaction gases from a hydrocarbon cooled steel converter which is bottom blown by oxygen; with the converter comprising a vessel tippable between an upright position and an inclined position, the vessel provided with bottom tuyeres, the vessel having a mouth and provided with a setting ring detachably connectable to the vessel in substantially sealed engagement about the mouth, the setting ring also in substantially sealed engagement with a suction line which communicates in flow series with gas cleaning means; a method for handling excess hydrogen buildups in the converter and characterized by steps as follows:

Step a. detecting by means of a gas analyzer a predetermined buildup in hydrogen content of the reaction gases during the blowing with oxygen,

Step b. on the detecting of the hydrogen buildup per Step a preceding, causing the gas analyzer to effect the connection of the setting ring to the vessel,

Step c. on the detecting of the hydrogen buildup per Step a preceding, causing the converter to be automatically tipped to operate valves for shutting off the oxygen and bottom blowing the vessel with an inert gas for flushing of the cleaning means to provide a barrier of the inert gas between atmospheric air and combustiles in the gas cleaning means.

4,002,468

SCRAP SMELTING PROCESS

William O. Stauffer, Moraga, Calif., assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Apr. 28, 1975, Ser. No. 571,983

Int. Cl.² C22B *21/00*

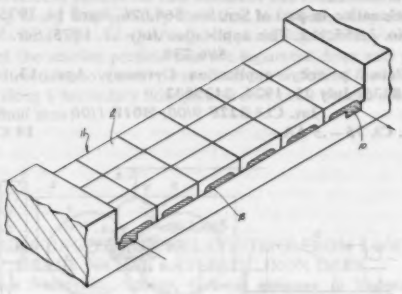
U.S. Cl. 75—68 R 8 Claims

1. A process for melting a scrap metal in molten metal which comprises:

A. conducting a flow of a quantity of molten metal through a metal heating surface to form a shallow bath of up to 1 inch in depth therein, wherein said bath is covered by a plurality of thermally conductive ceramic tiles and wherein a heating source is located above said bath and the upper surface of said tiles;

B. superheating said metal to at least 1400° F in said furnace;

C. removing the superheated metal of step B from said furnace and placing said removed superheated metal in contact with a quantity of scrap metal whereby said scrap



metal is submerged therein and melted, and impurities are generated, thereby forming a scrap melt;

D. removing said impurities from the scrap melt of step C; and

E. returning the melt of step D to said furnace and then repeating step A.

4,002,469

SEPARATION OF METALS

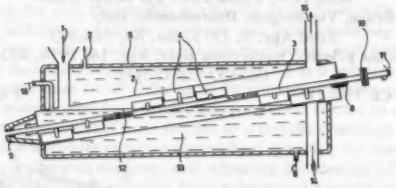
Raymond Edward Oliver, Johannesburg, South Africa, and George McGuire, London, England, assignors to Matthey Rustenburg Refiners (Pty) Ltd., Johannesburg, South Africa

Filed Mar. 18, 1975, Ser. No. 559,425

Claims priority, application United Kingdom, Mar. 21, 1974, 12599/74

Int. Cl.² C22B *11/04*

U.S. Cl. 75—101 R 10 Claims



1. A process for the separation of base metal and silver components from a solid particulate mixture thereof with precious metal which comprises the steps of:

a. contacting said solid particulate mixture of base metal, silver and precious metal components, any of which may be in metallic or in chemically combined form, with substantially anhydrous sulphuric acid at a temperature within the range of 140° to 250° C and which is sufficiently high to convert most of the base metal and silver components to water soluble sulphates while leaving the precious metal component in an essentially water insoluble solid state and

b. separating the said water soluble sulphates from the solid precious metal component by contacting the product from step (a) with water and dissolving therein the said water soluble sulphates formed in step (a).

4,002,470
PROCESS FOR RECOVERING RUTHENIUM

Isao Isa, Misato, and Tutomu Takahashi, Shibukawa, both of Japan, assignors to The Japan Carlit Co., Ltd., Tokyo, Japan

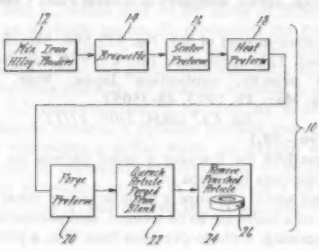
Filed Nov. 18, 1975, Ser. No. 633,096
Claims priority, application Japan, Dec. 10, 1974, 49-141809; Dec. 10, 1974, 49-141810; Dec. 10, 1974, 49-141811
Int. Cl.² C22B *61/00*; C01G *55/00*
U.S. Cl. 75—101 R 22 Claims

1. A process for recovering ruthenium which comprises: treating a ruthenium-containing substance, sparingly soluble in any of water, an acid solution and a basic solution, with an alkaline fusion mixture containing from 10 to 70% by weight of an inorganic peroxide at a temperature of from 250° to 750° C., dissolving the fusion product in a first acid solution with an acid concentration of from 2 to 50% by weight, then oxidizing the ruthenium compound dissolved in the resulting solution in a second acid solution to liberate ruthenium tetroxide, said second acid solution having an acid concentration of from 1 to 90% by weight and containing from 1 to 2000 parts by weight of an oxidizing agent per 1 part by weight of ruthenium as metal, distilling ruthenium tetroxide under a reduced pressure of from 90 to 700 mmHg and at a temperature of from 50° to 90° C. in a gas stream of a stabilizing agent for ruthenium tetroxide, collecting the distillate in a solution selected from the group consisting of a third acid solution and a basic solution, reducing the collected product and recovering from the resulting reduction product ruthenium metal or a compound thereof, soluble either in water, an acid solution or in a basic solution, said stabilizing agent being selected from the group consisting of oxygen, chlorine, carbon dioxide and nitrogen.

4,002,471
METHOD OF MAKING A THROUGH-HARDENED SCALE-FREE FORGED POWDERED METAL ARTICLE WITHOUT HEAT TREATMENT AFTER FORGING

Myron C. Sarnes, and Robert N. Haynie, both of Northville, Mich., assignors to Federal-Mogul Corporation, Detroit, Mich.

Filed Sept. 24, 1973, Ser. No. 400,071
Int. Cl.² B22F *3/00*
U.S. Cl. 75—200 6 Claims



1. A method of making a through-hardened scale-free forged powdered metal article having a density of at least about 99.5% of theoretical, a surface hardness of at least Rc 40, and an as forged dimension requiring no further machining other than surface grinding, all directly from quenching comprising:

compressing an iron alloy powder into a briquette,

sintering said briquette into a sintered preform;

adjusting the temperature of said preform to such degree as to put said preform in an austenetic condition;

forging said heated preform in one step while at said austenetic condition into a forged article;

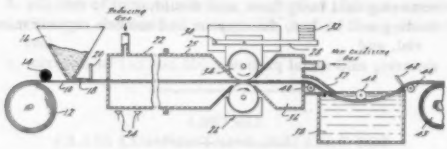
quenching said forged article in an oil quenching bath substantially immediately after said forging step while remaining in said austenetic condition; and

removing said quenched forged article from the quenching bath, and stress relieving said forged article to produce a forged powdered metal article having a surface hardness of at least Rc 40 and a surface finish and dimension requiring no further machining other than surface grinding.

4,002,472
PROCESS FOR MAKING COMPOSITE BEARING MATERIAL

Gordon J. LeBrasse, and Victor Gallatin, both of Ann Arbor, Mich., assignors to Federal-Mogul Corporation, Southfield, Mich.

Filed May 1, 1975, Ser. No. 573,977
Int. Cl.² B22F *3/18*
U.S. Cl. 75—208 R 10 Claims



1. A process for making a composite bearing material comprising a steel backing strip having a copper-lead bearing alloy lining tenaciously bonded to at least one side thereof which comprises the steps of applying a layer of a prealloyed powder on the surface of a steel backing strip, said prealloyed powder containing about 64% to about 88% copper, about 8% to about 35% lead and up to about 10% tin and ranging in average particle size of from about one micron up to about 147 microns, heating the prealloyed powder layer and said backing strip to a temperature of about 1450° F to about 1600° F in a reducing atmosphere for a period of time sufficient to effect a liquid phase sintering of the powder and the formation of a bond between said layer and said backing strip, cooling the sintered layer and backing strip to about 1000° F to about 1200° F in a protective atmosphere and applying pressure thereto to effect a substantially complete densification of said powder layer and a further diffusion bonding of the powder particles to each other and to the surface of said backing strip, and thereafter cooling the composite strip in a protective environment to a temperature below about 800° F.

4,002,473
METHOD OF MAKING AN ANODE

Gerhart P. Klein, Manchester, Mass., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Division of Ser. No. 196,328, Nov. 8, 1971, Pat. No. 3,809,552.
This application Nov. 29, 1973, Ser. No. 420,140
Int. Cl.² B22F *1/00*
U.S. Cl. 75—211 9 Claims

1. A method of making capacitor anodes comprising providing a mold having cavities therein which have been filled with a slurry of film-forming metal, moving headed or barbed ends of risers made of film-forming metal into the cavities, freezing slurry around ends of the risers while maintaining the ends in the cavities to form shaped masses, removing the shaped masses from the cavities, sintering the shaped masses at an elevated temperature to form rigid bodies, and forming a dielectric oxide over the rigid bodies.

6. In a method of making a body suitable for use as an anode in a capacitor, the steps of shaping a mass including film-forming metal powder and a freezable bonding agent around a headed or barbed portion of an anode riser, freezing the bonding agent to bond powder together around the headed or barbed portion of the anode riser to provide a shaped mass, sintering the shaped mass to form a rigid body including the anode riser, and forming a dielectric oxide film of the film-forming metal over the body.

4,002,474

LUBRICANTS FOR POWDERED METALS

John Blachford, Westmount, Canada, assignor to H. L. Blachford Limited, Montreal, Canada

Filed July 31, 1975, Ser. No. 600,777
Int. Cl.² B22F *3/00*
U.S. Cl. 75—211 12 Claims

1. A method of producing a sintered metal part from powdered metal comprising

blending said powdered metal with a lubricant comprising discrete pressure-rupturable microcapsules comprising a core of a non-corrosive liquid organic lubricant able to wet said powdered metal, and surrounding said core a thin polymeric solid shell, to form an intimate mixture,

compacting said mixture in a mould at a pressure effective to rupture said shell and release said liquid lubricant and to form said mixture into a self-supporting shaped body,

removing said body from said mould,

heating said body to decompose and remove organic material, and

sintering said metal particles.

4,002,475

PHOTOCONDUCTIVE PROCESS FOR MAKING ELECTROGRAPHIC MASTERS

Robert J. Ott, Rochester, and Hans G. Franke, Hilton, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 5, 1975, Ser. No. 574,204
Int. Cl.² G03G *13/22*; B44C *1/04*
U.S. Cl. 96—1 E 11 Claims

1. A process of forming an image on a photoconductive element, at least one surface of the element having an exposable zone coextensively contacting a solution of non-photosensitive, polymeric, cationic resin, the process comprising the simultaneous steps of

positively biasing the photoconductive element to establish a substantially uniform field across the element and resin solution; and

imagewise exposing the exposable zone to activating radiation to preferentially adhere the resin to exposed portions of the surface whereby said exposed portions form an image.

4,002,476

METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT

John Wales, Bishops Stortford, England, assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 580,460, May 23, 1975. This application May 3, 1976, Ser. No. 682,826
Int. Cl.² G03G *13/10*
U.S. Cl. 96—1 LY 2 Claims

1. A method of liquid development of electrostatic latent images which comprises moving into developing contact a resilient photoreceptor bearing a latent electrostatic image and a rigid liquid applicator carrying liquid developer, said photoreceptor having a resilient surfaced base, a shrunk polymeric film in compressive contact with said base, a layer of conductive material over said film, and a layer of less than about 80 microns of photoconductive material overlying the conductive material.

4,002,477

DIFFUSION TRANSFER PROCESSES AND ELEMENTS USING OR CONTAINING INERT TRANSITIONAL METAL COMPLEX OXIDIZING AGENTS

Vernon Leon Bissonette, Brookport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 420,193, Nov. 28, 1973, abandoned, and a continuation-in-part of Ser. No. 256,072, May 23, 1972, Pat. No. 3,834,907, and a continuation-in-part of Ser. No. 189,289, Oct. 14, 1971, abandoned, said Ser. No. 256,072, is a continuation-in-part of Ser. No. 150,741, June 7, 1971, abandoned. This application Aug. 22, 1975, Ser. No. 606,999
Int. Cl.² G03C *7/00*, *5/54*, *1/40*, *1/76*
U.S. Cl. 96—3 27 Claims

1. In a photographic image-transfer film unit comprising (1) a support having thereon at least one layer containing a silver halide emulsion having associated therewith an image dye-providing material, (2) an image dye-receiving layer containing an image dye mordant and (3) means for discharging an alkaline processing solution within said film unit, the improvement wherein said film unit comprises (a) a silver halide developing agent and (b) a positively charged inert transition metal ion complex oxidizing agent capable of having at least two valence states and having a coordination number of 6, which undergo redox reaction in the presence of metallic silver, and which are substantially inert to said redox reaction in the absence of a metal or chalcogen catalyst.

4,002,478

METHOD FOR FORMING RELIEF PATTERN

Tomoo Kokawa; Yoshikathu Nakao, and Kunio Akiyama, all of Hiratsuka, Japan, assignors to Kansai Paint Company, Ltd., Japan

Continuation-in-part of Ser. No. 451,504, March 15, 1974, abandoned. This application Jan. 2, 1976, Ser. No. 646,345
Claims priority, application Japan, Mar. 15, 1973, 48-29394; Mar. 29, 1973, 48-35052
Int. Cl.² G03C *5/00*, *11/12*
U.S. Cl. 96—38.1 11 Claims

1. A method for forming a relief pattern on a substrate which comprises the steps of:

adhering under pressure a photosensitive sheet on the surface of a substrate to be treated, said photosensitive sheet comprising: a photo-pervious base film, a photo-impervious ink layer printed in the part other than desired pattern portion on said photo-pervious base film, a releasing layer, a photosensitive resin layer and a layer of a photo-curable ink in said pattern portion between said releasing layer and photosensitive resin;

II. radiating actinic rays through said photo-pervious base film on said photosensitive sheet on said substrate to cure said photosensitive resin layer in portions corresponding to said pattern portion;

III. peeling off the upper layer of said photo-pervious base film, photo-impervious ink layer and releasing layer, while leaving said photosensitive resin layer and said photo-curable ink layer on said substrate; and

IV. contacting a washing solution with said photosensitive resin layer and said photo-curable ink layer on said substrate to wash away any un-cured portions of said photosensitive resin layer.

4,002,479
2-THIOURACIL IN HEAT-DEVELOPABLE LIGHT-SENSITIVE MATERIALS

Nobuo Suzuki; Yasuhiro Noguchi, and Takao Masuda, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed June 25, 1975, Ser. No. 590,524
Claims priority, application Japan, June 26, 1974, 49-72992
Int. Cl.² G03C 1/02, 1/34
U.S. Cl. 96—114.1 10 Claims

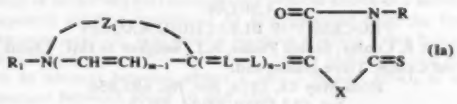
1. A heat-developable light-sensitive material which comprises a support containing therein or in one or more layers thereon at least (a) an organic silver salt which is substantially colorless, which is comparatively stable to light and which forms a silver image by reaction with a reducing agent when heated to a temperature above 80° C in the presence of an exposed light-sensitive silver halide, (b) a light-sensitive silver halide or a component capable of forming a light-sensitive silver halide on reaction with the organic silver salt, (c) a reducing agent, and (d) at last one of a 2-thiouracil.

4,002,480
PHOTOGRAPHIC SILVER HALIDE EMULSION

Masanao Hinata; Yuji Mihara; Reiichi Ohi; Keiichi Adachi, and Akira Sato, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

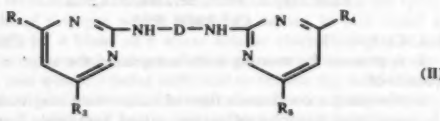
Filed Mar. 6, 1975, Ser. No. 555,912
Claims priority, application Japan, Mar. 7, 1974, 49-26620
Int. Cl.² G03C 1/08
U.S. Cl. 96—122 9 Claims

1. A photographic silver halide emulsion containing at least one dinuclear merocyanine dye represented by the formula (Ia):



(Ia)

wherein R and R_1, which may be the same or different, each represents an aliphatic group; Z_1 represents the nonmetallic atoms required to form a 5- or 6-membered heterocyclic nucleus selected from the group consisting of a thiazole nucleus, a thiazoline nucleus, an oxazole nucleus, a selenazole nucleus, a 3,3′-dialkylindolenine nucleus, an imidazole nucleus, a tetrazole nucleus, a pyridine nucleus and a quinoline nucleus; X represents a sulfur atom, an oxygen atom or a N—R′ wherein R′ represents an alkyl group or an aryl group; L represents a methine group; m represents 1 or 2; and n represents 1, 2, or 3, and at least one compound of the formula (II):



(II)

wherein D represents a divalent aromatic group, R_2, R_3, R_4, and R_5, which may be the same or different, each represents a hydrogen atom, a hydroxy group, an alkoxy group, an aryloxy group, a halogen atom, a heterocyclic group, a mercapto group, an alkylthio group, an arylthio group, a heterocyclic thio group, an amino group, an alkylamino group, a cycloalkylamino group, an arylamino group, a heterocyclic amino group, an aralkylamino group, or an aryl group.

4,002,481
COMPOSITION FOR CORROSION PROTECTION USING METAL SILICIDES OR ALLOYS OF SILICON AND METALS

James P. McKaveney, Claremont, Calif., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Apr. 9, 1975, Ser. No. 566,483
Int. Cl.² C09K 3/00; C23F 11/00; C09D 5/08
U.S. Cl. 106—14 24 Claims

1. A composition suitable for the anodic protection of corrodible metallic surfaces which comprises a binder and a filler, the filler being present in an amount sufficient to impart corrosion resistant characteristics to the composition and selected from the group consisting of:

a. alloys of silicon and barium, calcium, magnesium, lithium, cerium, titanium, lanthanum, manganese and mixtures thereof,

b. silicides of barium, calcium, magnesium, lithium, cerium, titanium, lanthanum, manganese and mixtures thereof, and

c. mixtures of (a) and (b).

4,002,482
GLASS COMPOSITIONS SUITABLE FOR INCORPORATION INTO CONCRETE

Matthias Christian Coenen, Mainz, Germany, assignor to Jenaer Glaswerk Schott & Gen., Mainz, Germany

Continuation-in-part of Ser. No. 549,973, Feb. 14, 1975, abandoned. This application Nov. 18, 1975, Ser. No. 633,078
Int. Cl.² C03C 13/00; C04B 7/02
U.S. Cl. 106—40 V 14 Claims

1. Glasses suitable for use as a long term reinforcing agent in concrete or in other cementitious matrix and having a composition consisting essentially of:

	Weight Percent
SiO_2	20–70
TiO_2	3–12
ZnO	5–70
CuO	0–10
Fe_2O_3	0–5
BaO	0–30
CaO	0–10
MgO	0–15
Al_2O_3	0–30

wherein the ratio of the molar sum of $Al_2O_3 + MgO + CaO$ to the molar sum of $ZnO + CuO + TiO_2 + Fe_2O_3$ present in the composition is equal to or less than 0.5, in which metallic oxides selected from the group consisting of As_2O_3, Sb_2O_3, V_2O_5, B_2O_3, PbO, CdO, SnO_2 and M_2O wherein M is an alkali metal, if present, amount to not greater than 0.4 mole % altogether, and whereby said composition delays the curing of said concrete or cementitious matrix and increases the formation of heat when said composition reacts with said concrete or cementitious matrix.

4,002,483
EXPANSIVE CEMENT

Kenneth E. Daugherty, Lewisville; John P. Luker, Comanche; Joseph H. Allen, Irving, all of Tex., and Waldemar A. Klemm, Columbia, Md., assignors to General Portland, Inc., Dallas, Tex.

Filed June 12, 1975, Ser. No. 586,225
Int. Cl.² C04B 7/02
U.S. Cl. 106—89 36 Claims

1. An expansive cement composition made of argillaceous and calcareous materials and containing from about 1 to about 70% by weight thereof of free CaO and from about 2 to about 7% by weight thereof of MgO uniformly distributed therein, with the remaining portion of said materials being primarily tricalcium silicate and containing substantially no dicalcium silicate.

4,002,484
PROCESS FOR THE MANUFACTURE OF A FINE WHITE FILLER FOR INDUSTRIAL PURPOSES

Jacques Baudouin, Montelimar, France, assignor to Ciments Lafarge S.A., France

Filed Nov. 9, 1973, Ser. No. 414,449

Claims priority, application France, Nov. 13, 1972, 72.40247

Int. Cl.² C09C *1/02*

U.S. Cl. 106—306 23 Claims

1. A process for preparing ettringite or calcium trisulfoaluminate ($3\,CaO \cdot Al_2O_3 \cdot 3CaSO_4 \cdot 32\,H_2O$) according to a reaction depicted by at least one of the following reaction schemes:

a. $CaO{\cdot}Al_2O_3 + 2(CaO{\cdot}H_2O) + 3(CaSO_4{\cdot}2H_2O) + 24H_2O \rightarrow$ ettringite

b. $(CaO)_2Al_2O_3 + 3(CaSO_4{\cdot}2H_2O) + 26\,H_2O \rightarrow$ ettringite

c. $CaO(Al_2O_3)_2 + 5(CaO{\cdot}H_2O) + 6(CaSO_4{\cdot}2H_2O) + 47H_2O \rightarrow 2$ ettringite

d. $12\,CaO{\cdot}7Al_2O_3 + 9(CaO{\cdot}H_2O) + 21(CaSO_4{\cdot}2H_2O) + 173H_2O \rightarrow 7$ ettringite

e. $CaO{\cdot}6Al_2O_3 + 17(CaO{\cdot}H_2O) + 18(CaSO_4{\cdot}2H_2O) + 139H_2O \rightarrow 6$ ettringite

which comprises forming a substantially stoichiometric mixture of calcic aluminate and calcium sulfate in an amount of water which is at least a stoichiometric proportion and at most sufficient to yield a product containing 5 percent by weight of (dry) ettringite and 95 percent by weight of water, and effecting reaction at a temperature in the range of from 20° to 90° C; the calcium sulfate having as white a color as possible, and the stoichiometric mixture and the stoichiometric proportion being based on the reaction.

4,002,485
PROCESS FOR THE PRODUCTION OF THERMOPLASTIC SYNTHETIC MATERIALS OF CHEMICALLY MODIFIED PROTEIN AND PLASTIC SHAPING MATERIALS OF CHEMICALLY MODIFIED PROTEIN AND A CHEMICAL PLASTICIZER

Klaus-Dieter Hammer, Mainz; Wolfgang Klendauer, Wiesbaden, and Max Bytzek, Naurod, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

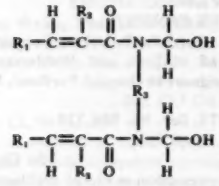
Filed Oct. 3, 1975, Ser. No. 619,222

Claims priority, application Germany, Oct. 7, 1974, 2447679

Int. Cl.² C07G *7/00*; C08L *89/00*

U.S. Cl. 106—136 15 Claims

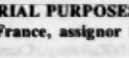
1. A process for the production of a thermoplastic synthetic material of chemically modified protein which comprises mixing an aqueous alkaline protein solution with an aqueous solution of a tetrafunctional, doubly unsaturated compound of the general formula



in which

R_1 and R_2 are hydrogen or an alkyl group with 1 to 6, preferably 1 to 3, carbon atoms, and

R_3 is the group $-(CH_2)_n-$, n being an integer from 1 to 8, or the group



in which R_4 is an alkyl group with 1 to 18 carbon atoms, subjecting the liquid mixture to a dwell time, causing a precipitating liquid to act upon the liquid, viscous mixture, freeing the formed precipitate from excess liquid, drying, mixing the precipitate with an at least bifunctional, saturated, organic compound, and subjecting the mixture to heat and pressure.

4,002,486
GLYOXAL COMPOSITION

Yasuo Kotani, Hirakata, and Kunio Kageyama, Amagasaki, both of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 434,339, Jan. 17, 1974, Pat. No. 3,912,529. This application Feb. 5, 1975, Ser. No. 547,269

Claims priority, application Japan, Feb. 1, 1973, 48-13929; July 9, 1973, 48-77651; July 13, 1973, 48-79549

Int. Cl.² C08L *3/02*

U.S. Cl. 106—213 1 Claim

1. A powdery composition consisting essentially of glyoxal, at least one water-soluble starch selected from the group consisting of soluble starch, oxidized starch, hydroxyethyl starch, acetate starch, phosphate starch, and cationized starch, and water; the ratio of glyoxal and the water-soluble starch being in the range of about 1:2 to about 10:1 and water being in the range of about 5 to about 25 percent by weight in the composition.

4,002,487
PROCESS FOR BLEACHING KAOLIN

Robert F. Conley, Scotch Plains, N.J., assignor to IMC Chemical Group, Terre Haute, Ind.

Filed May 13, 1976, Ser. No. 685,850

Int. Cl.² C04B *33/04*, *33/13*

U.S. Cl. 106—288 B 4 Claims

1. In a process for treating raw kaolin clay to improve the color and brightness by bleaching the clay in an aqueous dispersion with sodium dithionite, the improvement consisting of treating the dispersion with hydroxylamine or salt thereof within about 1 to 5 hours after the treatment with sodium dithionite is complete.

4,002,488
CLEANING, POLISHING, AND DRYING NAILS BY MOVING THEM THROUGH VIBRATORY TROUGHS

Tony Campanelli, 243 Flora Parkway, Addison, Ill. 60101

Filed May 5, 1975, Ser. No. 574,312

Int. Cl.² B08B *3/10*

U.S. Cl. 134—7 10 Claims

1. A process for treating nails comprising the steps in sequence of:

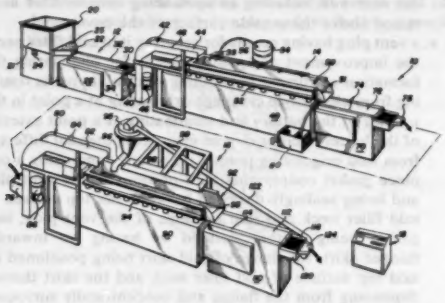
a. providing a continuous flow of nails which may include unwanted particles of matter mixed therewith from a source,

b. subjecting the nails to a vibratory separating mechanism to remove unwanted particles of matter,

c. cleaning the nails by moving same through a first vibratory trough while flowing cleaning solution over the nails,

d. polishing and drying the nails by moving same through a second vibratory trough filled with a drying and polishing media to thereby mix and agitate the nails with the media, and

(e) separating the used media from the nails, whereby pol-



ished and clean nails are produced in a continuous manner.

4,002,489

METHOD OF PICKLING METALLIC MATERIAL

Tore Hedqvist; Einar Gunnarsson, and Benny Flodin, all of Torshalla, Sweden, assignors to Nyby Bruk AB, Sweden

Filed June 25, 1974, Ser. No. 482,999
Int. Cl.² C23G *1/02*, *1/08*
U.S. Cl. 134—28 20 Claims

1. A method of pickling metallic material consisting of stainless steel by the continuous treatment of said material in strip and wire forms wherein said material is subjected to a two-step pickling treatment which comprises a first step of subjecting the material to chemical attack of a first aqueous solution heated to a temperature above room temperature and containing HF in an amount of about 7 to 25% and a second step of subjecting said material to chemical attack of a second aqueous solution containing an acid different from the first aqueous solution, said second aqueous solution being heated to a temperature above room temperature and containing HF in an amount between about 1 and 7 % and HNO_3 in an amount between about 10 and 25%.

4,002,490

PAINT SPRAY BOOTH CHEMICAL TREATMENT

Raymond J. Michalski, Riverdale, and Alan H. Fisher, Calumet City, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Feb. 20, 1975, Ser. No. 551,806
Int. Cl.² B08B *3/08*
U.S. Cl. 134—38 3 Claims

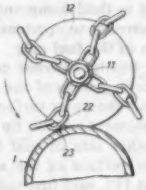
1. In a process for controlling pollution and contamination in paint or lacquer spray booths in which water is used to wash the air in the spray booth and to remove over-sprayed paints or lacquers and solids are removed from the water which is then recirculated for further use in washing the air in the spray booth, of the type which comprises adding to said water a quantity of a blend of a water soluble electrolyte salt of an amphoteric metal and a polycationic water dispersible polymer, said quantity being sufficient to reduce the tackiness of paints and lacquers and thereby reduce the tendency of over-sprayed paints and lacquers to adhere to walls, ceilings and floors of said spray booths, said polymer also being effective to condition paint and lacquer solids removed with said water so that they can be separated from the water which is then returned for recirculation in the process, the improvement comprising adding to said water containing the blend of a water soluble electrolyte salt of an amphoteric metal and a cationic water dispersible polymer, from 1–30 ppm of a polypropylene glycol, said polypropylene glycol having an average molecular weight of from 100 to 1,000.

4,002,491

REMOVAL OF COATINGS BY ROTATING CHAIN FLAILS

Jose O. Esparza, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Aug. 25, 1975, Ser. No. 607,395
Int. Cl.² B08B *1/04*
U.S. Cl. 134—6 12 Claims



9. A method for removing a coating from a substrate without significantly damaging the substrate comprising rotating several chain-like flails against the coating while maintaining each flail oriented and positioned with respect to the coating surface so that the next-to-last terminal link of each flail barely strikes the coating on the edge of the link, twists and then whips the terminal link flat against the coating on the side of the link.

4,002,492

RECHARGEABLE LITHIUM-ALUMINUM ANODE

Bhaskara M. L. Rao, Fanwood, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed July 1, 1975, Ser. No. 592,219
Int. Cl.² H01M *35/02*
U.S. Cl. 429—194 7 Claims

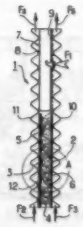
1. An improved high energy density electrochemical cell for operation at temperatures below about 150° C which comprises an anode consisting essentially of between about 63 and 92% lithium and the balance essentially aluminum, a cathode and a nonaqueous electrolyte of an organic solvent having a lithium salt dissolved therein.

4,002,493

FUEL CELL STRUCTURE AND SYSTEM, MORE PARTICULARLY FOR A CARBON FUEL AND ATMOSPHERIC AIR

Bernard Warszawski, Paris, France, assignor to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM), Paris, France

Filed Jan. 17, 1975, Ser. No. 541,996
Claims priority, application France, Jan. 25, 1974, 74.02516
Int. Cl.² H01M *8/06*
U.S. Cl. 429—26 24 Claims



1. Fuel cell comprising a plurality of elements (1) arranged substantially in side-by-side relationship and in electrical contact with one another, each element including a pervious

cathode electrode (2) and a pervious anode electrode (3), each electrode containing a catalyst, the electrodes being mounted in spaced relation relative to each other with mutually facing inner surfaces; and an aqueous electrolyte (6) in the space between the inner surfaces of the electrodes and contacting said electrodes;

a plurality of condenser-heat exchanger means (7) each having at least one generally upwardly directed heat exchange surface located above the electrodes of at least one element and in fluid communication with the space between the electrodes to condense water vapor formed during operation of the fuel cell;

a first corrugated bipolar current collector (10), the tip portions of the corrugations of one side of the first collector bearing against the outer surface of the cathode electrode ( ) of one element and the tip portions of the corrugations at the other side of said first collector bearing against the outer surface of the anode electrode of an adjacent element (1), said first collector further extending along at least a substantial portion of an upwardly directed heat exchange surface of a condenser-heat exchanger means (7) with tip portions thereof in communication with said heat exchange surface, said corrugations of said first collector defining a path for flow of a combustive gas adjacent and in contact with said cathode electrodes and adjacent with said heat exchange surface, said path defined adjacent said heat exchange further defining a condensing space for water vapor;

a second corrugated bipolar current collector (11), the tip portions of the corrugations of one side of said second collector bearing against the outer surface of the anode electrode (3) of one element and the tip portions of the corrugations at the other side of said second current collector bearing against the cathode electrode of another adjacent element (1), said second collector further extending along at least a substantial portion of another upwardly directed heat exchange surface of a condenser-heat exchanger means (7) with tip portions thereof in communication with said another heat exchange surface, said corrugations of said second collector defining a path for flow of a gaseous fuel adjacent and in contact with said anode electrode and adjacent with said another heat exchange surface;

said paths defined by said corrugations being substantially in parallel planes; and

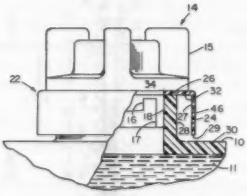
fluid guide means (12) in fluid communication with said condensing space and with said space of an element to provide a downward flow path to return condensed water to the electrolyte within said space.

4,002,494

VENT PLUG

Frank A. Vengrofski, Rockledge, Pa., assignor to ESB Incorporated, Philadelphia, Pa.

Filed July 17, 1975, Ser. No. 596,900
Int. Cl.² H01M 2/00
U.S. Cl. 429—89 **4 Claims**



1. In a storage battery comprising:

a. a container;

b. a cover for the container;

c. an electrolyte within the container;

d. a vent well formed in the cover, the vent well providing access from outside the container to the interior thereof, the vent well including an upstanding annular filler neck raised above the outside surface of the cover, and;

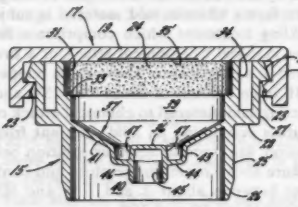
e. a vent plug having means for securing it in said filler neck, the improvement comprising means for eliminating the formation of current conducting electrolyte paths resulting from electrolyte creepage originating at a point in the interior of the battery and terminating at a point exterior of the battery and having an electrical potential different from said originating point, said means comprising a one piece gasket cooperating with portions of the vent plug and being sealingly disposed between the top surface of said filler neck and said portions of the vent plug, said gasket being further defined as having an inwardly flanged skirt, the flange of said skirt being positioned on said top surface of said filler neck and the skirt thereof depending from the flange and concentrically surrounding said filler neck with the inner surface of said skirt spaced from the outer surface of said filler neck, the lower edge portion of said skirt being spaced from the upper surface of the cover for the container.

4,002,495

EXPLOSION-PROOF VENT BARREL FOR A BATTERY

Duane D. Hakarine, Minneapolis, Minn., assignor to Gould Inc., Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 549,304, Feb. 12, 1975, abandoned. This application Feb. 12, 1976, Ser. No. 657,567
Int. Cl.² H01M 2/12
U.S. Cl. 429—87 **25 Claims**



1. An explosion-proof vent for closing the cell opening of a storage battery comprising a top frame plate and a tubular body releasably mounted in depending fashion from said top plate, said tubular body being molded of plastic for sealing engagement in said cell opening, said body defining a compartment with an aperture therein to permit gas from within said battery cell to flow into said compartment, a disc made of porous material interposed between an upper end of said body and said frame for covering the upper end of said body compartment, and means for maintaining a spatial separation of less than 0.015 inches between said top frame plate and at least a portion of said disc for allowing gases within said compartment to readily escape through said disc while retarding the entrance of a flame into the space between said frame plate and disc.

4,002,496

CATALYTIC DEVICE FOR STORAGE BATTERY

Hidethugu Nitta, and Masaru Watanabe, both of Kyoto, Japan, assignors to Japan Storage Battery Co., Ltd., Kyoto, Japan

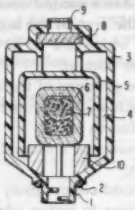
Filed Dec. 19, 1974, Ser. No. 534,410
Int. Cl.² H01M 2/12
U.S. Cl. 429—53 **9 Claims**

1. In a catalytic device for a battery containing an aqueous electrolyte into which oxygen and hydrogen gases generated as a result of electrolysis of the aqueous electrolyte pass and are catalytically recombined into water, which returns to the electrolyte; the improvement which comprises

a. a catalyst body;

b. a gas-permeable catalyst vessel having said catalyst body arranged therein;

c. a condenser vessel housing said catalyst vessel, said condenser vessel having an opening only at the lower portion thereof;



d. an outer vessel of said catalytic device housing said condenser vessel; and

e. means for passing a gas from said condenser vessel through a gap between said condenser vessel and said outer vessel.

4,002,497
THERMOELECTRIC BATTERIES

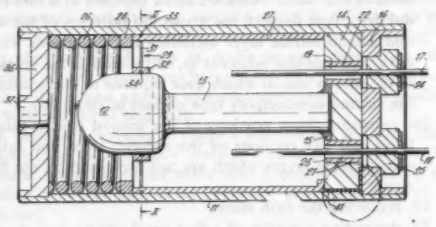
Michael Harold Brown, Didcot, England, assignor to United Kingdom Atomic Energy Authority, England

Filed Sept. 17, 1975, Ser. No. 614,178

Claims priority, application United Kingdom, Sept. 30, 1974, 42423/74

Int. Cl.² H01L *37/00*

U.S. Cl. 136—202 **5 Claims**



1. A thermoelectric battery comprising a casing enclosing an assembly comprising a heat source secured to one end of a thermoelectric unit, the other end of the thermoelectric unit being mounted in heat conducting contact with the casing, there being a space surrounding at least the heat source end of the assembly between the assembly and the casing, the heat source end of the assembly being provided with a fibre support for restraining movement of the heat source relative to the casing.

4,002,498
ELECTROLYTE-DEPOLARIZERS FOR THERMAL BATTERIES

Richard L. Blucher, Baltimore, Md., assignor to Catalyst Research Corporation, Baltimore, Md.

Filed Mar. 22, 1962, Ser. No. 182,714

Int. Cl.² H01V *1/30*; H01M *10/00*

U.S. Cl. 136—205 **8 Claims**

1. A unitary electrolyte-depolarizer wafer for thermal deferred action cells, the wafer being a pressure compacted composition consisting essentially of an intimate finely divided mixture of a depolarizer, a fusible alkali metal salt electrolyte, and a finely divided inert absorbent, said absorbent being present in an amount sufficient to absorb said electrolyte when in a fluid condition.

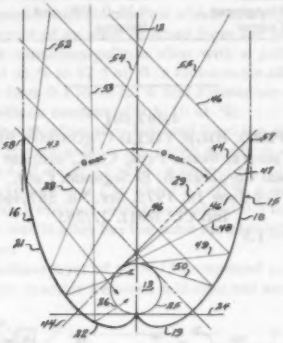
4,002,499
RADIANT ENERGY COLLECTOR

Roland Winston, Chicago, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 26, 1974, Ser. No. 492,074

Int. Cl.² H01V *1/30*

U.S. Cl. 136—206 **17 Claims**



1. A radiant energy concentration device, comprising, an energy receiver positioned tangent to a reference plane, said energy receiver having a first reference axis extending therethrough, with said first reference axis being perpendicular to said reference plane so that said energy receiver extends along said first reference axis away from said reference plane, a first side wall for directing radiant energy positioned on a first side of said energy receiver and having first and second portions, said second portion of said first side wall having the shape of the involute of said first side of said energy receiver and extending from a point of tangency of said energy receiver to said reference plane to a first shadow line of said energy receiver, said first shadow line being defined as the line which crosses said first reference axis at a point on the same side of said reference plane as said energy receiver at an angle $\theta_{1\ max}$ and further which is tangent to said energy receiver on the same side of said first reference axis as said first side wall, said first portion of said first side wall being an extension of said second portion of said first side wall and extending from said first shadow line to no further than a first terminal point, $\theta_{1\ max}$ thereby being the maximum angle from said first reference axis at which all radiation energy crossing said first reference axis at an angle equal to or less than $\theta_{1\ max}$ is directed into said energy receiver by said first side wall, said first portion of said first side wall being shaped so that all radiant energy crossing said first reference axis at said angle $\theta_{1\ max}$ and striking any point on said first portion of said first side wall is directed along a line tangent to said energy receiver, said first terminal point being the point wherein with said first portion of said first side wall extending to said first terminal point a tangent to said first side wall at said first terminal point is parallel to said first reference axis.

4,002,500
THERMOCOUPLE EXTENSION WIRE

Teh Po Wang, North Caldwell, N.J., assignor to W. B. Driver Company, Newark, N.J.

Continuation-in-part of Ser. No. 129,460, March 30, 1971, abandoned, which is a continuation-in-part of Ser. No. 822,786, April 1, 1969, abandoned. This application July 31, 1975, Ser. No. 600,282

Int. Cl.² H01L *35/20*; 136 *241;227;236 R*

U.S. Cl. 136—241 **3 Claims**

1. A negative thermocouple extension wire composition for use with a positive copper thermocouple extension wire in a Platinum/Platinum-Rhodium thermocouple system wherein

the positive thermoelement of the system is a Platinum-Rhodium alloy selected from the group consisting of Platinum-10 percent Rhodium and Platinum-13 percent Rhodium, the composition consisting essentially of in percent by weight:

Nickel	0.5–1.5%
Manganese	0.25–0.40%; and
Copper	Balance

4,002,501

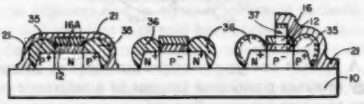
HIGH SPEED, HIGH YIELD CMOS/SOS PROCESS

Ronald K. Tamura, Buena Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed June 16, 1975, Ser. No. 587,465

Int. Cl.² H01L 21/265

U.S. Cl. 148—1.5 **7 Claims**



1. A process for making complementary metal-oxide semiconductor devices in silicon sapphire comprising the steps of

1. providing a wafer comprising a layer of silicon of a first conductivity type on a sapphire substrate;
2. forming a first silicon oxide layer over the silicon layer;
3. providing a first mask over said first silicon oxide layer to define regions of the first silicon oxide layer which are to be removed;
4. removing those portions of the first oxide layer which are not protected by the first mask to expose the silicon thereunder;
5. removing the first mask;
6. providing a second mask over the patterned first oxide layer and the exposed silicon to exclude ions which are to be ion implanted from entering the silicon underlying masking portions of the second mask;
7. ion implanting into the portions of the silicon layer which are not ion-masked by the second mask, conductivity-type-determining ions which induce a second conductivity type in order to convert the ion implanted portions of the silicon from the first conductivity type to the second conductivity type;
8. removing the second mask;
9. removing the portions of the silicon which were exposed by steps (4) and (8) to form a plurality of separate silicon islands each having an upper surface protected by those portions of the first silicon oxide layer which were not removed in step (4);
10. removing any remaining portions of the first silicon oxide layer to expose the upper surface of each of the islands;
11. thermally growing a second silicon oxide layer on the silicon islands;
12. depositing a first silicon nitride layer at least over those portions of the second silicon oxide layer which overlie the upper surfaces of silicon islands;
13. providing a third mask on said wafer to protect selected portions of said first silicon nitride layer which overlie the silicon islands;
14. removing those portions of the first silicon nitride layer which are left exposed by the third mask;
15. removing the third mask;
16. depositing a third silicon oxide layer over the wafer;
17. providing a fourth mask on the wafer to protect the third silicon oxide layer except for those portions of the third silicon oxide layer which overlie the silicon areas which are to be exposed to a second conductivity type dopant or which are over the area of the sapphire which is adjacent to silicon areas which are to be exposed to the second conductivity type dopant;
18. removing those portions of the second and third silicon oxide layers which are not protected by the fourth mask;
19. removing the fourth mask;
20. depositing a source of a second conductivity type dopant on the wafer;
21. driving the second conductivity type dopant for a sufficient period of time to insure adequate concentration of second conductivity type dopant in the exposed portions of the silicon islands;
22. removing the source of the second conductivity type dopant;
23. thermally growing a fourth silicon oxide layer;
24. depositing a second silicon nitride layer over the wafer, said second silicon nitride layer covering both those portions of the silicon islands which were exposed to the second conductivity type dopant and the areas of the sapphire adjacent thereto which were exposed to the second conductivity type dopant in order to surround, with the second silicon nitride layer, those portions of the silicon islands which were exposed to the second conductivity type dopant;
25. providing a fifth mask on the wafer to protect said second silicon nitride layer except for those portions of the second silicon nitride layer which overlie those portions of the wafer which are to be exposed to a first conductivity type dopant, the protected portions of the second silicon nitride layer including those portions which cover the sapphire adjacent to, and surround the portions of the silicon islands which were exposed to said source of the second conductivity type dopant in step (20);
26. removing those portions of the second silicon nitride layer and any portions of the second, third and fourth silicon oxide layers which are not protected by the fifth mask;
27. removing the fifth mask;
28. depositing a source of a first conductivity type dopant on the surface of the wafer;
29. driving the first conductivity type dopant for a period of time sufficient to insure an adequate concentration of the first conductivity type dopant in those portions of the silicon which are to be converted from the second conductivity type to first conductivity type;
30. removing the source of the first conductivity type dopant;
31. removing the first and second silicon nitride layers and any remaining portions of the second silicon oxide layer;
32. thermally growing a fifth silicon oxide layer;
33. depositing a third silicon nitride layer over the wafer;
34. providing a sixth mask to protect the third silicon nitride layer except for those portions of the third silicon nitride layer which are to be removed prior to deposition of the metallization which will form contacts to the silicon;
35. removing those portions of the third silicon nitride layer and any silicon oxide which are not protected by the contact mask;
36. removing the sixth mask;
37. depositing a layer of metallization on the wafer to form contacts;
38. providing a seventh mask over the metallized wafer to protect those portions of the metallization which are to be retained; and
39. removing any exposed metallization.

4,002,502

ALUMINUM BASE ALLOYS

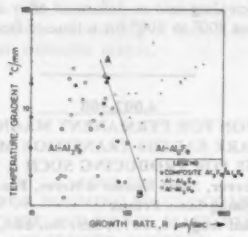
Ian Frank Bainbridge, Lower Templestowe, Australia, and Colin McLean Adam, Pakuranga, New Zealand, assignors to Comalco Aluminium (Bell Bay) Limited, Tasmania and The University of Queensland, Queensland, both of, Australia

Continuation-in-part of Ser. No. 277,511, Aug. 3, 1972, abandoned. This application Aug. 6, 1974, Ser. No. 495,286

Claims priority, application Australia, Aug. 9, 1971, 5827/71

Int. Cl.[2] C22F *1/04*

U.S. Cl. 148—3 6 Claims



1. In a method of casting aluminum-iron alloy from a melt with a controlled temperature gradient between the solid and liquid metal and with a controlled rate of growth of the alloy phases as they solidify, said alloy consisting essentially of aluminum and 0.5 to 10% by weight of iron and having a cast microstructure containing aluminum and eutectic compounds including Al_3Fe and Al_6Fe and mixtures thereof, the improvement which comprises providing in said melt at least one constituent from the group consisting of lithium, sodium, strontium or barium in an amount which is effective to improve the strength or ductility of said alloy by producing in said alloy a refined form of Al_3Fe or very fine Al_6Fe, the amount of each constituent being up to 0.1% by weight of said melt and the total amount of such constituents not exceeding 0.4% by weight of said melt.

3. Method according to claim 1 wherein the resultant alloy is subjected to prolonged thermal treatment just below the eutectic temperature for more than 8 hours, followed by air cooling or water quenching, whereby improved ductility is obtained.

4,002,503

TREATMENT OF METALS AND ALLOY

Alan Arthur Bourne; Jack Chambers Chaston, and Alan Sydney Darling, all of London, England, assignors to Johnson Matthey & Co., Limited, London, England

Continuation of Ser. No. 76,615, Sept. 29, 1970, abandoned, which is a continuation-in-part of Ser. No. 581,443, Sept. 23, 1966, Pat. No. 3,547,712. This application Apr. 1, 1975, Ser. No. 564,203

Int. Cl.[2] B22F *3/20*; B01J *23/42*, *23/46*

U.S. Cl. 148—11.5 P 2 Claims

1. In a method of improving the mechanical properties of a previously strengthened metal composition comprising a platinum-rhodium alloy and including, as a dispersed phase, zirconium oxide as a strengthening element, said method comprising the steps of cold-working said composition by working the same at a temperature below that at which substantial recrystallization occurs and subsequently annealing the composition, the improvement whereby all of said cold-working at a temperature below that at which substantial recrystallization occurs is carried out prior to any annealing and the extent of cold-working is such that the recrystallization effected during annealing results in an elongated grain structure highly oriented in the direction of working.

4,002,504

MULTIFILAMENT SUPERCONDUCTORS

David G. Howe, Greenbelt, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 23, 1975, Ser. No. 643,899

Int. Cl.[2] H01L *39/00*

U.S. Cl. 148—11.5 R 8 Claims

1. A composite superconductor which comprises:

multifilaments of an alloy selected from the group consisting of a vanadium-gallium alloy with a gallium content from 0.4 at. % to 12.5 at. %, a niobium-tin alloy with a tin content from 0.1 to 12 at. % and a vanadium-silicon alloy with a silicon content of 0.5–10 at. %;

a matrix sheath of an alloy selected from the group consisting of a copper-gallium alloy with a gallium content from about 0.4 to about 22 at. %, a copper-tin alloy with a tin content from about 1 to about 11 at. %, a copper-silicon alloy with a silicon content from about 0.5 to 14 at. %, so that the matrix alloy has the same metal solute as the core alloy; and

an intermediate layer of an A-15 compound produced by a solid state reaction between said core rod and said matrix sheath.

4,002,505

STABILIZATION OF ALUMINUM ARSENIDE

Roelof P. Bult, Fruitvale, Canada, assignor to Cominco Ltd., Vancouver, Canada

Filed July 28, 1975, Ser. No. 599,514

Claims priority, application Canada, June 20, 1975, 229814

Int. Cl.[2] C22F *1/02*

U.S. Cl. 148—20.3 6 Claims

1. In a method for the preparation of aluminum gallium arsenide crystals having improved chemical stability, said crystals being represented by the general formula $Al_{1-x}Ga_xAs$ wherein x has values in the range of about 0.02 to 0.30, the improvement which comprises annealing said crystals at a temperature in the range of from 700° to 1050° C. in the presence of arsenic vapour at an arsenic vapour pressure of about 1 kg/cm².

4,002,506

SEMI-HARD MAGNETIC GLASS SEALABLE ALLOY SYSTEM OF COBALT-NICKEL-TITANIUM-IRON

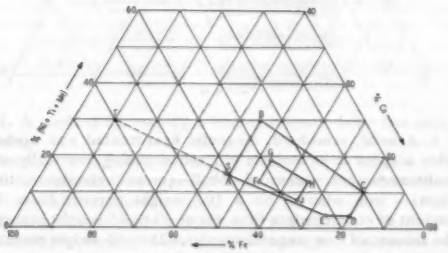
Christian Radeloff, Bruchkobel, and Horst Herrmann, Hanau, both of Germany, assignors to Vacuumschmelze GmbH, Germany

Filed Aug. 7, 1975, Ser. No. 602,779

Claims priority, application Germany, Aug. 7, 1974, 2437921

Int. Cl.[2] C04B *35/00*

U.S. Cl. 148—31.55 7 Claims



1. A solid, semi-hard, magnetic alloy adapted to be sealable in glass, said alloy being characterized by having a coersive force of from about 16 to 60 amperes per centimeter, a remanence ratio of from about 0.75 to 0.95, a remanence flux

density of from about 1.3 to 1.6 Tesla and a saturation flux density of from about 1.5 to 1.75 Tesla, said alloy being further characterized by being substantially free from a thermal expansion hysteresis, said alloy consisting essentially of a multicomponent system of cobalt- (nickel, titanium, Me) iron wherein Me is at least one metal selected from the group consisting of aluminum, copper, tungsten, molybdenum, vanadium, and chromium, and wherein on a 100 weight percent total alloy basis the amount of cobalt ranges from about 45 to 80 weight percent, the amount of iron ranges from about 10 to 40 weight percent, and the total amount of nickel, titanium and Me ranges from about 3 to 30 weight percent and wherein, on such basis, the amount of nickel ranges from about 1.9 to 21 weight percent, the amount of titanium ranges from about 1 to 5 weight percent, and the amount of Me ranges from about 0.1 to 4 weight percent, and the sum of titanium and Me ranges from about 2.2 to 7 weight percent, said alloy being defined by the polygonal region ABCDE of FIG. 1 which is delimited by the polygonal course -

A (45% Co; 15% (Ni+Ti+Me); 40% Fe) -
B (45% Co; 30% (Ni+Ti+Me); 25% Fe) -
C (80% Co; 10% (Ni+Ti+Me); 10% Fe) -
D (80% Co; 3% (Ni+Ti+Me); 17% Fe) -
E (75% Co; 3% (Ni+Ti+Me); 22% Fe) - A,

said alloy having been prepared by the steps of sequentially -

a. melt fusing the starting metals at temperatures ranging from about 1500° to 1560° C.,
b. preliminarily annealing said alloy at temperatures ranging from about 600° to 1100° C.,
c. cold deforming said alloy by at least about 70%, and
d. finally annealing said so deformed alloy at temperatures from about 500° to 700° C for a time of from about 0.5 to 4 hours.

4,002,507

NIOBIUM-FREE SEMI-HARD MAGNETIC GLASS SEALABLE ALLOY SYSTEM OF COBALT- (NICKEL, ALUMINUM, TITANIUM)- IRON

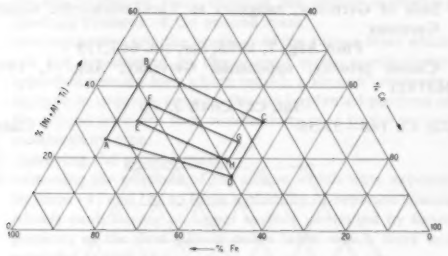
Christian Radeloff, Bruchkobel, and Horst Herrmann, Hanau, both of Germany, assignors to Vacuumschmelze GmbH, Germany

Filed July 1, 1975, Ser. No. 592,242

Claims priority, application Germany, July 3, 1974, 2431874

Int. Cl.² C04B *35/00*

U.S. Cl. 148—31.55 **5 Claims**



1. A solid, semi-hard, magnetic heat-treated and worked alloy adapted to be sealable in glass consisting essentially of a multicomponent system of cobalt- (nickel, aluminum, titanium) - iron wherein on a 100 weight percent basis the amount of cobalt ranges from about 10 to 45 weight percent, the amount of iron ranges from about 25 to 65 weight percent, and the total amount of nickel, aluminum, and titanium ranges from about 15 to 45 weight percent and wherein, on such basis, the amount of nickel ranges from about 10 to 40 weight percent, the amount of aluminum ranges from about 1 to 4 weight percent, and the amount of titanium ranges from about 0.5 to 4 weight percent, and the sum of aluminum and titanium ranging from about 2 to 5 weight percent, said alloy being defined by the polygonal region ABCD of FIG. 1 which is delimited by the polygonal course.

A (10 % Co; 25 % (Ni+Al+Ti); 65 l % Fe) —
B (10 % Co; 45 % (Ni+Al+Ti); 45 % Fe) —
C (45 % Co; 30 % (Ni+Al+Ti);25 % Fe) —
D (45 % Co; 15 % (Ni+Al+Ti); 40 % Fe) — A,

said alloy having been prepared by the steps of sequentially

a. melt fusing the starting metals at temperatures ranging from about 1500° to 1560° C.,
b. preliminarily annealing said alloy at temperatures ranging from about 700° to 900° C.,
c. cold deforming said alloy by at least about 70%, and
d. finally annealing said so deformed alloy at temperatures from about 500° to 700° for a time of from about 1 to 3 hours.

4,002,508

COMPOSITION FOR PERMANENT MAGNETS OF THE FAMILY "RARE EARTHS-TRANSITION METALS" AND PROCESS FOR PRODUCING SUCH A MAGNET

Jean-Paul Haberer, Saint Martin d'Heres, France, assignor to Aimants Ugimag S.A., France

Filed Aug. 14, 1975, Ser. No. 604,747

Claims priority, application France, Aug. 27, 1974, 74.29345

Int. Cl.² H01F *1/04*

U.S. Cl. 148—31.57 **6 Claims**

1. A permanent magnet having a residual intrinsic induction of at least 7,400 Gauss and an intrinsic coercive field of at least 29,200 Oersteds and having as the active magnetic component a degassed and sintered product of compacted particulate material, said material containing an amount of 35 to 42 % by weight of samarium, an amount of 64.5 to 43 % by weight of cobalt and an amount of 0.5 to 15 % by weight of nickel.

4,002,509

PROCESS FOR THE MANUFACTURE OF A HIGH STRENGTH CHAIN AND THE PRODUCT OBTAINED THEREBY

Barbro Marie Rohlin, Sandviken; Sten Lennart Bergh, Vaxholm, and Gustav Nils Herman Westerberg, Borlange, all of Sweden, assignors to Stora Kopparbergs Bergslags Aktiebolag, Falun, Sweden

Filed Dec. 22, 1975, Ser. No. 643,122

Claims priority, application Sweden, Dec. 23, 1974, 7416252

Int. Cl.² C21D *9/00*

U.S. Cl. 148—34 **5 Claims**

1. In a process for the manufacture of a chain having an ultimate tensile strength of at least 90 kg/mm² and an impact value at ±0° C of at least 2.8 kgm, the improvement comprising hot rolling a steel ingot consisting essentially of:

C	=0.04 – 0.10	% by weight
Si	=0.1 – 1.2	% by weight
Mn	=2.2 – 3.0	% by weight
Cr	=1.5 – 3.0	% by weight
Mo	=0.10 – 0.60	% by weight
N	=0.005 – 0.020	% by weight
Al Acid soluble	=0.015 – 0.10	% by weight
Nb or V up to	=0.1	% by weight.
Fe containing normal contaminants = remainder		

to a bar of a dimension suitable for use in a chain, cutting said bar into pieces of adjusted length and resistance heating the same to 700° – 900° C, bending and flash-butt welding said pieces to connect the same into links of a chain, heat treating said chain by heating to a temperature of 700° – 900° C and then cooling the chain in air.

4,002,510
STAINLESS STEEL IMMUNE TO STRESS-CORROSION CRACKING

Bryan E. Wilde, Indiana Township, Allegheny County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

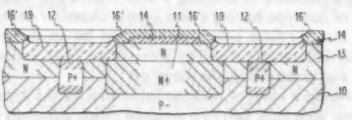
Filed May 1, 1975, Ser. No. 573,652
Int. Cl.² C22C *38/02, 38/40*
U.S. Cl. 148—38 **4 Claims**

1. An austenitic stainless steel virtually immune to stress-corrosion cracking and intergranular stresscorrosion cracking consisting essentially of 0.005 to 0.08% carbon, 0.01 to 0.04% nitrogen, 16.0 to 20.0% chromium, 8.0 to 10.0% nickel, 3.5 to 5.5% silicon, up to 1.5% manganese, up to 0.15% copper and the balance iron with conventional residual impurities, and having a microstructure consisting of from 7 to 45 volume % delta ferrite in an austenitic matrix.

4,002,511
METHOD FOR FORMING MASKS COMPRISING SILICON NITRIDE AND NOVEL MASK STRUCTURES PRODUCED THEREBY

Ingrid E. Magdo, and Steven Magdo, both of Hopewell Junction, N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Apr. 16, 1975, Ser. No. 568,546
Int. Cl.² H01L *21/308*
U.S. Cl. 148—187 **9 Claims**



1. In the fabrication of integrated circuits, a method for altering the characteristics of exposed portions in a masked silicon substrate comprising

forming a first mask comprising silicon dioxide on said silicon substrate having at least one opening exposing the substrate,

forming on said first mask, a mask comprising silicon nitride having at least one opening laterally smaller than said at least one opening in said first mask and respectively in registration with at least one opening in said first mask whereby said second mask contacts and covers a portion of said exposed silicon substrate under said at least one registered opening, and

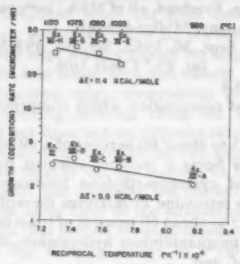
thermally oxidizing the substrate remaining exposed in said at least one opening to convert the exposed silicon into silicon dioxide recessed into said substrate.

4,002,512
METHOD OF FORMING SILICON DIOXIDE

Mahn-Jick Lim, Lower Makefield Township, Bucks County, Pa., assignor to Western Electric Company, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 506,622, Sept. 16, 1974, abandoned. This application Apr. 14, 1975, Ser. No. 568,215
Int. Cl.² H01L *21/18*
U.S. Cl. 148—187 **23 Claims**

1. A method of depositing a glass layer comprising SiO_2 on a surface of a substrate which comprises initially combining gaseous SiH_2Cl_2 with an oxidizing gas, selected from the group consisting of O_2, CO_2, N_2O, H_2O and mixtures thereof in a liquid phase free ambient at a temperature ranging from about 450° C to about 1200° C to directly form and deposit SiO_2 on

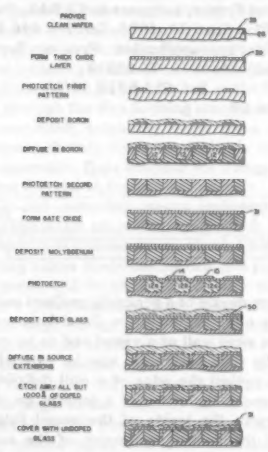


the substrate surface at a rate which is substantially temperature independent.

4,002,513
BUCKET-BRIGADE DELAY LINE HAVING REDUCED PARASITIC CAPACITANCES AND METHOD FOR MAKING THE SAME

Walter J. Butler, Scotia; Mark B. Barron, Camillus, both of N.Y., and Bruno F. Kurz, deceased, late of Schenectady, N.Y. (by Elizabeth Kurz-Beerli, executrix), assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 25, 1975, Ser. No. 552,940
Int. Cl.² H01L *21/225*
U.S. Cl. 148—187 **9 Claims**



1. A method for making a bucket brigade delay line comprising

selectively diffusing a plurality drain-source regions of a first conductivity type into one surface of a substrate of opposite conducting type,

forming a gate oxide layer on said surface,

forming a plurality laterally spaced apart gate electrodes on said oxide layer, each of said gate electrodes having first and second laterally separated edges, said first edge overlapping one of said drain regions,

diffusing extensions of said drain-source regions by utilizing said gate electrodes as a diffusion mask so that the lateral extent of said extensions is limited by said second edge.

4,002,514

NITROCELLULOSE PROPELLANT COMPOSITION

John J. Plomer, Midland; Gerald R. Staudacher, Bay City, and Keith Roberson, Freeland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sept. 30, 1965, Ser. No. 493,306
Int. Cl.² C06D 5/06
U.S. Cl. 149—19.4 5 Claims

1. A propellant composition which comprises on a weight basis;

a. from about 5 to about 60 percent of a nitramine oxidizer, said oxidizer being a member selected from the group consisting of cyclotrimethylene trinitramine, cyclotetramethylene tetramine or mixtures thereof,

b. from about 5 to about 60 percent of triaminoguanidinium azide, triaminoguanidinium hydrazinium diazide or mixtures thereof, and

c. from about 35 to about 60 percent of a plasticized nitrocellulose binder.

4,002,515

HYDROXYETHYL CELLULOSE THICKENED HYDRAZINE AND SUBSTITUTED HYDRAZINES

Thomas J. Galvin, Wilmington, Del., assignor to ICI United States Inc., Wilmington, Del.

Filed Oct. 22, 1965, Ser. No. 502,440
Int. Cl.² C06B 47/08
U.S. Cl. 149—36 8 Claims

1. A thickened composition comprising:

1. a major amount of a compound selected from the group consisting of hydrazine, methyl hydrazine, unsymmetrical dimethyl hydrazine, and mixtures thereof, and

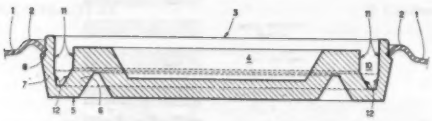
2. a minor amount of hydroxyethyl cellulose.

4,002,516

HERMETIC CLOSURE

Jean-Yves Gaborieau, Velizy, and Bernard Baumann, Courbevoie, both of France, assignors to CEBAL, Paris, France

Filed Sept. 24, 1975, Ser. No. 616,407
Claims priority, application France, Sept. 26, 1974, 74.33138; July 25, 1975, 75.23870
Int. Cl.² B32B 31/20
U.S. Cl. 156—69 16 Claims



1. A closure device of a generally resilient material comprising a sealing cap adapted to be fitted heremetically into an aperture in a rigid wall of a vessel and to be retained therein by a generally rigid peripheral annular part which is adapted to be urged against the edge of a wall defining the aperture and which under the stress of a tension on the sealing cap exerted towards the inside of the vessel folds back in the direction of the axis of symmetry of the said sealing cap around a hinged or articulated zone constituted by the bottom of an annular slot comprising side walls which are parallel over a substantial proportion of their height separating the annular part from a central part of the sealing cap, the hinged or articulated zone being located out of the plane of the aperture, and an annular locking member which is adpated to be press-fitted into the annular slot and to cooperate therewith wherein the annular locking member can only be separated from the annular slot by the positive application of an external force.

12. A process for applying a thermoplastic sealing cap having an annular slot in the top surface thereof in a container having an aperture with a surrounding wall comprising the steps of;

a. locating said sealing cap within the container aperture;

b. locally heating the portion of said cap in contact with the edge of the surrounding wall until it begins to soften; and

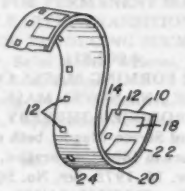
c. inserting an annular, nondeformable locking member into said annular slot while said cap portion is soft, whereby a hermetic seal is formed between the edge of said wall and the portion of said cap in contact therewith.

4,002,517

TACKED FILM ROLL AND METHOD OF MAKING SAME

Robert I. Edelman, Rochester; Willis L. Stockdale, Fairport; Robert A. Sylvester, Hilton, and Corrado Zollo, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 499,381, Aug. 21, 1974, Pat. No. 3,958,870. This application Dec. 24, 1975, Ser. No. 644,228
Int. Cl.² B32B 31/20
U.S. Cl. 156—73.4 4 Claims



1. The method of forming a film-loaded photographic cartridge of the type having a film supply chamber defined in part by an intermediate cartridge wall and by an outer cartridge wall carried, respectively, by a cartridge body and a cartridge cover and comprising the steps of:

providing a strip of photographic film of the type having a first web face carrying a raised stripe adjacent one longitudinal edge of said strip and a second web face carrying a photosensitive emulsion;

forming said strip into a roll thereof having a plurality of convolutions;

supporting an end face of said roll on the intermediate wall of a cartridge body; and

so applying heat to the opposite end face of said roll as to melt the emulsion layer of one convolution at the interface thereof with the raised stripe of an adjacent convolution to cause said convolutions to adhere at said interface.

4,002,518

HELICALLY FLUTED DEEP HOLE CATHODE AND METHOD OF MAKING SAME

Richard H. Shaw, Hampden, Mass., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 455,839, March 28, 1974, Pat. No. 3,880,745. This application Jan. 16, 1975, Ser. No. 541,668
Int. Cl.² B32B 5/08, 31/16
U.S. Cl. 156—154 5 Claims

1. The method of producing a hollow cathode for use in electrochemical drilling deep holes of small diameter in a workpiece comprising the steps of:

A. providing a conductive metal cathode tube having an exterior dielectric coating of selected thickness,

B. attaching a plurality of threadlike members to one end of the cathode tube at substantially equally spaced circumferential stations therearound,

C. helically winding the threadlike members around and toward the other end of the cathode tube while maintaining the circumferential spacing to form helical flutes around the tube,

D. securing the other ends of the threadlike members to the other end of the cathode tube,

E. applying an insulating layer over the exterior of the

cathode tube and helically wound threadlike members to produce a helically fluted cathode tube with an electrically insulated exterior, and

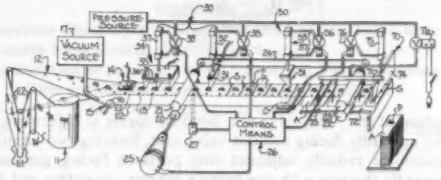
F. providing an electrode tip of selected diameter at one end of the cathode tube.

4,002,519

APPARATUS AND METHOD FOR FORMING POUCHES

Ronald E. Moseley, Rock Hill, S.C., and Henry G. Stewart, Harrisburg, N.C., assignors to Engraph, Inc., Charlotte, N.C.

Filed Feb. 12, 1975, Ser. No. 549,462
Int. Cl.² B31B 1/14, 1/22, 19/14, 21/14
U.S. Cl. 156—204 19 Claims



3. A method of forming successive pouches from a web of plastic film comprising

advancing the web of plastic film from a supply source to a folding station and folding the web along a longitudinal fold line so as to position one free longitudinal edge of the web between the fold line and the other free longitudinal edge of the web to thereby define a two-ply portion between the fold line and said one free longitudinal edge of the web and a single ply portion adjacent thereto between the said one free longitudinal edge of the web and said other free longitudinal edge,

advancing the folded web from the folding station to a sealing station and sealing together confronting surfaces of the two-ply portion along longitudinally spaced apart seal areas extending transversely across the two-ply portion to thereby define in the two-ply portion of the folded web a series of successive pouches interconnected by the seal areas,

advancing the thus sealed folded web from the sealing station to a flap forming station and successively severing and removing from the single ply portion of the web, in areas adjacent to and in transverse alignment with each of the seal areas, longitudinally spaced transversely extending waste areas to thereby form the single ply portion into a series of successive flaps extending alongside each of the succesive pouches and adapted for being folded over the pouches to close the same,

each successive severing and removing operation comprising the steps of supporting the single ply portion of the web surrounding the waste area to be removed while piercing the web at a predetermined point spaced from the free longitudinal edge of the single ply portion and corresponding to one end of the waste area, thereafter severing the single ply portion from the point of piercing along two spaced apart cut lines extending generally transversely across the single ply portion toward the free longitudinal edge while grasping the single ply portion of the web in said waste area and closely adjacent to said free longitudinal edge, maintaining grasping the web while continuing severing along the two transversely extending cut lines and on opposite sides of the point of grasping and to and through the free longitudinal edge of the web to thereby cut the waste area free from the remaining web, and releasing the cut-out waste area and ejecting the same clear of the advancing web, and

advancing the thus formed series of interconnected pouches from the flap forming station to a cut-off station and successively cutting transversely across the folded web and across a medial portion of each seal area to thereby separate the interconnected pouches from one another.

15. Apparatus for forming successive pouches from a web of plastic film comprising

a folding station including means for receiving a web of plastic film from a supply source and folding the web along a longitudinal fold line so as to position one free longitudinal edge of the web between the fold line and the other free longitudinal edge of the web to thereby form a two-ply portion between the fold line and said one free longitudinal edge of the web and a single ply portion adjacent thereto between said one free longitudinal edge of the web and the other free longitudinal edge,

means for advancing the web through the folding station and forwardly therefrom along a predetermined path,

a sealing station positioned forwardly of the folding station and including means for sealing confronting surfaces of the two-ply portion of the web together along longitudinally spaced apart seal areas extending transversely across the two-ply portion to thereby define a series of successive pouches interconnected by the seal areas as the folded web is advanced through the sealing station,

a flap forming station positioned forwardly of the folding station and including means for successively severing and removing from the single ply portion, as the folded web is advanced through the flap forming station, longitudinally spaced transversely extending waste areas of predetermined shape to thereby form the single ply portion into a series of successive flaps adapted for being folded over the pouches formed in the two-ply portion,

said severing and removing means including means for supporting the single ply portion of the web surrounding the predetermined shaped waste area to be removed, a reciprocating cutter blade having one end thereof sharpened and positioned for piercing the single ply portion of the web at a predetermined point spaced from the free longitudinal edge of the single ply portion and corresponding to one end of the waste area to be removed and having a pair of spaced apart sharpened cutting edges extending from said one sharpened end and being inclined at an angle to the plane of the web for thereafter severing the single ply portion from the point of piercing along two spaced apart cut lines extending generally transversely across the single ply portion to the free longitudinal edge thereof, means operating in timed relation with said cutter blade for grasping the single ply portion of the web in said waste area closely adjacent the free longitudinal edge during severing of the waste area along said cut lines, and for releasing the cut-out waste area upon completion of severing thereof from the remaining web, and means operating in timed relation with said cutter blade for ejecting the cut-out waste area clear of the advancing web after the piercing and severing operation is completed,

and a cut-off station located forwardly of the sealing station and the flap forming station and including means for

successively cutting transversely across the folded web and across a medial portion of each seal area to thereby separate the interconnected pouches from one another.

4,002,520

MANUFACTURE OF VEHICLE SEATS

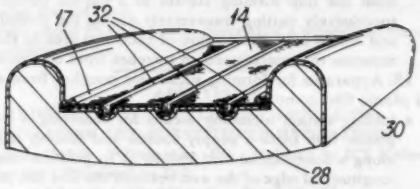
Sidney Desmond Fenton, Forton, near Preston, England, assignor to Storey Brothers and Company Limited, White Cross, England

Filed Feb. 5, 1973, Ser. No. 329,953

Claims priority, application United Kingdom, Feb. 11, 1972, 6544/72

Int. Cl.² B29C *9/00, 27/06;* **B29D** *7/02, 27/04*

U.S. Cl. 156—246 **10 Claims**



1. The method of making a loose cover for a padded item comprising:

A. forming a thermoplastic sheet comprising a sealing surface layer and a foam backing layer by casting a skin coating of a plasticized vinyl chloride polymer followed by a foamable vinyl chloride polymer coating on an embossed temporary support, fusing and blowing said coating to give said thermoplastic sheeting, and removing said thermoplastic sheeting from said temporary support;

B. shaping said thermoplastic sheet by vacuum forming to give a shaped thermoplastic cover which generally corresponds to the shape of the desired padded item;

C. welding the edges of at least one fabric panel to said shaped thermoplastic cover, said panel being secured by said welding to the underside of said shaped thermoplastic cover; and

D. removing thermoplastic sheet material from the region within that defined by the edges of the welded fabric and being over said fabric panel to expose said fabric panel from the outside of said shaped thermoplastic cover, and thereby obtaining said loose cover.

4,002,521

METHOD OF FORMING, MOUNTING AND USING FLUSH VALVES FOR FLUSH TANKS AND THE LIKE

Adolf Schoepe, 1620 N. Raymond Ave., Fullerton, Calif. 92631, and Fredric E. Schmuck, 535 Century Drive, Anaheim, Calif. 92805

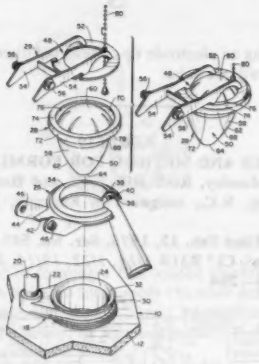
Division of Ser. No. 497,524, Aug. 15, 1974. This application Apr. 9, 1975, Ser. No. 566,211

Int. Cl.² B29C *19/00;* **B32B** *31/00*

U.S. Cl. 156—293 **10 Claims**

1. In a method of mounting a flush valve in a flush tank and the like, the flush tank being of the type having a flush valve seat portion opening downwardly therethrough with an upper end portion having a generally upwardly facing annular end surface; the steps of: forming a valve seat ring completely separate of said flush valve seat portion; forming a closure member completely separate of said flush valve seat portion; hingedly assembling said valve seat ring directly with said closure member into a hinged integrated unitary assembly still completely separate of said flush valve seat portion and with guiding portions between said valve seat ring and said closure member positively guiding said closure member hingedly movable upwardly angled away from and downwardly angled toward a downward sealing position abuttingly sealing against said valve seat ring; and mounting said previously assembled separate valve seat ring and closure member integrated unitary assembly directly on and totally confined to said upper end portion over said end surface of said tank flush valve seat portion in free standing hingedly operable condition without other mounting connection including free of any flush tank walls by mounting said valve seat ring securely solely on said upper end portion of said tank flush valve seat portion with sealing means between said ring and end portion.

6. In a method of forming and using a flush valve in a flush tank and the like, the flush tank being of the type having a flush valve seat portion opening downwardly therethrough with an upper end portion having a generally upwardly facing annular end surface; the steps of: forming a generally upwardly facing annular valve seat on the upwardly facing end



surface of the flush valve seat portion; during said forming of said upwardly facing annular valve seat, forming two annular concentric radially adjacent ring portions facing generally upwardly thereon with one being a greater projecting and the other being a lesser projecting ring portion; mounting a closure member movable downwardly to and upwardly away from a sealing position with a resilient sealing surface facing said valve seat ring portions in said sealing position; sealing said closure member sealing surface in said closure member sealing position primarily abutting said greater projecting of said two annular concentric radially adjacent ring portions on said valve seat during initial use of said closure member; and after said closure member initial use and during later use, sealing said closure member sealing surface in said closure member sealing position abutting both said greater projecting and said lesser projecting of said two annular concentric radially adjacent ring portions on said valve seat.

4,002,522

FILM SPLICING DEVICE

Leo Catozzo, Bivio per Tolfa, Km. 0,700, 00050 S. Severa, Italy

Filed July 14, 1975, Ser. No. 595,725

Claims priority, application Italy, Aug. 2, 1974, 52414/74

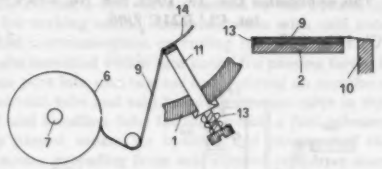
Int. Cl.² B31F *5/00;* **G03D** *15/04*

U.S. Cl. 156—506 **8 Claims**

1. A device for splicing together, strips of material with adhesive tape, the device comprising:

a lower dieplate for supporting the strips of material to be spliced together on a flat surface thereof; and a front bridge and a rear bridge located respectively adjacent lateral edges of said flat surface with respective tops projecting slightly above said flat surface and between which adhesive tape is to be stretched above the strips in

vicinity of that area at which they are to be jointed, at least one of said bridges being an oscillatable bridge mounted for movement between its position adjacent said flat surface and a retracted position away from said lower



dieplate which provides a gap between said lower dieplate and said oscillatable bridge; whereby an operator may readily insert his finger into the gap in order to grip an end of an adhesive tape carried by the oscillatable bridge subsequent to cutting of the tape.

4,002,523

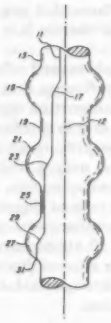
DISLOCATION-FREE GROWTH OF SILICON SEMICONDUCTOR CRYSTALS WITH <110> ORIENTATION

Lawrence Dean Dyer, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 396,654, Sept. 12, 1973, abandoned. This application May 19, 1975, Ser. No. 579,297

Int. Cl.² B01J *17/18;* **C01B** *33/02*

U.S. Cl. 156—617 SP **2 Claims**



1. In a method of forming silicon crystals with <110> crystallographic orientation, which comprises the steps of:

pulling a <110> crystal silicon stem having a long thin portion from a silicon melt, said crystal having a first diameter and dislocations propagating in a direction substantially parallel to the stem axis, said portion being sufficiently long to remove dislocations on 111 planes that are inclined to the <110> axis.

the improvement comprising (a) enlarging said crystal stem to a second diameter sufficiently great to divert the dislocation propagation path away from the stem axis,

b. then reducing said crystal stem to a third diameter sufficiently small to cause said dislocation to terminate at a crystal edge, and then

c. growing the remainder of the crystal.

4,002,524

METHOD AND APPARATUS FOR EVAPORATING LIQUID

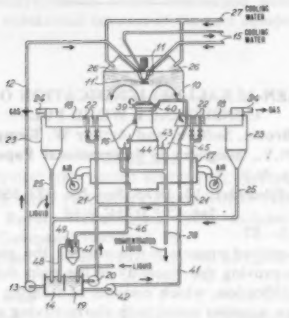
Jorgen Damgaard-Iversen, Birkerod; Klaus Erik Gude, Vedbaek; Ove Emil Hansen, Vaerlose; Bjorn Lund, Frederiksberg, and Mogens Petersen, Lyngby, all of Denmark, assignors to Aktieselskabet Niro Atomizer, Soborg, Denmark

Continuation of Ser. No. 287,868, Sept. 11, 1972, abandoned. This application Aug. 19, 1974, Ser. No. 498,607

Claims priority, application Denmark, Sept. 10, 1971, 4464/71

Int. Cl.² B01D *1/16;* **F26B** *3/12*

U.S. Cl. 159—4 B **17 Claims**



9. An apparatus or a system according to claim 8, wherein the gas inlet duct or tube is connected to supply means for particulate material downstream of and preferably adjacent to a Venturi throat on the gas inlet duct or tube.

4,002,525

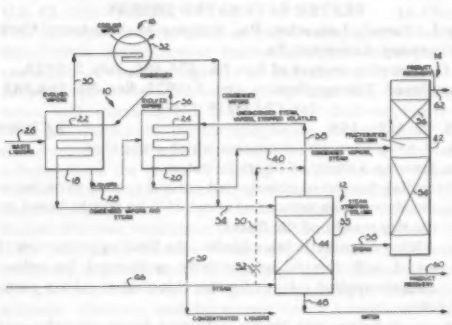
CHEMICAL RECOVERY FROM WASTE LIQUORS UTILIZING INDIRECT HEAT EXCHANGERS IN MULTI-STAGE EVAPORATION PLUS CONTACT STEAM STRIPPING

Kenneth W. Baierl, Appleton, Wis., assignor to Flambeau Paper Company, Park Falls, Wis.

Filed Mar. 13, 1975, Ser. No. 558,003

Int. Cl.² B01D *1/26, 1/00, 1/22*

U.S. Cl. 159—47 WL **23 Claims**



1. A process for treating waste liquors such as condensates and spent liquors derived from chemical processing operations, comprising the steps of:

directing said liquors to an evaporation zone;

heating said liquors in said evaporation zone to effect concentration of the liquors therein with consequent evolution of vapors, said heating including the step of directing a heating medium which includes steam to the evaporation zone for indirectly heating and concentrating at least a portion of said liquors therein;

condensing said vapors;

directing at least a portion of the condensed vapors to a stripping zone;

stripping at least a portion of the chemical constituents within said condensed vapors by subjecting the latter to the action of stripping steam in the stripping zone; and

directing at least a fraction of said stripping steam, after the latter has acted to strip chemical constituents from the condensed vapors in said stripping zone, back to said evaporation zone as at least a part of said heating medium for heating and concentrating additional volumes of liquor in the evaporation zone.

4,002,526

OXYGEN-ALKALI DELIGNIFICATION OF LOW CONSISTENCY WOOD PULP

Kenton J. Brown, Suffern, and Arthur W. Kempf, Warwick, both of N.Y., assignors to International Paper Company, New York, N.Y.

Filed Oct. 10, 1975, Ser. No. 621,355
Int. Cl.² D21C 9/10
U.S. Cl. 162—57 **13 Claims**

1. An improved process for increasing the yields of wood pulp and improving the viscosity of the pulp during oxygen-alkali delignification, which consists of treating with oxygen and alkali an aqueous wood pulp slurry having a consistency of between about 1 and 10% based on oven-dried pulp and a pH within the range of between about 9 and 13 and containing a member selected from the class consisting of ammonia in an amount of between about 0.1 and 3% by weight of oven-dried pulp and a compound releasing ammonia in an amount of between about 0.1 and 6% by weight of oven-dried pulp, at a temperature between about 200° and 260° F. and at an oxygen pressure of between about 30 and 300 psig.

4,002,527

SOLVENT-DISTRIBUTED, POWDERED RUBBER IN BEATER SATURATED SHEETS

Jay L. Piersol, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Continuation-in-part of Ser. No. 375,496, July 2, 1973, abandoned. This application Apr. 3, 1975, Ser. No. 564,883
Int. Cl.² D21F 11/00
U.S. Cl. 162—155 **9 Claims**

1. A beater saturation process which comprises

a. forming a slurry of fibers in water;

b. adding powdered chlorinated natural rubber particles to the slurry in an amount of about 25% by weight based on the dry weight of the fibers;

c. adding a synthetic latex binder, the binding properties of which will remain substantially unchanged by subsequently applied solvent for the chlorinated rubber particles;

d. precipitating said binder onto said fibers whereby said powdered rubber is carried with said binder to said fibers;

e. forming sheet from the rubber coated fibers;

f. drying the sheet;

g. treating the dried sheet with a solvent for the chlorinated rubber particles for a period of time sufficient to cause substantial swelling and smearing of the rubber particles throughout the fibers of the sheet without causing any significant swelling of the binder; and

h. removing the solvent.

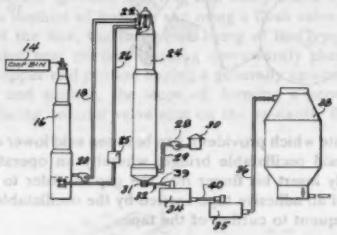
5. The process according to claim 1 in which said fibers comprise asbestos.

4,002,528

APPARATUS FOR PROCESSING PULP

Oliver A. Laakso, Glens Falls, N.Y., assignor to Kamyr, Inc., Glens Falls, N.Y.

Continuation of Ser. No. 227,438, Feb. 18, 1972, abandoned. This application Dec. 15, 1975, Ser. No. 640,926
Int. Cl.² D21C 7/00
U.S. Cl. 162—237 **2 Claims**



1. Apparatus for processing pulp comprising

a continuous cellulose digester including a discharge and means for washing digested material in said digester before discharge therefrom,

means for feeding material to be digested to said digester,

a blow line communicating with said digester discharge to receive digested material at a 6–15% solids content and at a pressure of about 10–20 atmospheres,

a first refiner for breaking up the solids in said digested material into individual fibers, said refiner including a pair of grinding surfaces that are spaced a distance X from each other,

means for connecting said first refiner in said blow line so that no pressure reduction will occur during transport of digested material to said first refiner other than pressure reductions that necessarily result from the transport of the digested material over a distance, and so that no decrease in solids content occurs,

a second refiner for breaking up the solids in said digested material into individual fibers, said refiner including a pair of grinding surfaces that are spaced a distance Y from each other, and wherein Y is substantially less than X,

means for connecting said second refiner in said blow line in series with said first refiner so that no pressure reduction will occur during transport of digested material to said second refiner from said first refiner other than pressure reductions that necessarily result from the transport of the digested material over a distance, and so that no decrease in solids content occurs, and

means for discharging refined digested material from said second refiner to a subsequent treatment station at a pressure of about 5–10 atmospheres, the pulp moving as an essentially air-free mass of digested material from said digester discharge through said refiners to said subsequent treatment station.

4,002,529

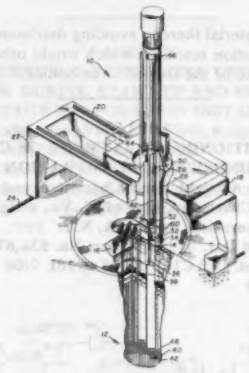
NUCLEAR FUEL HANDLING APPARATUS

Christo Andrea, Windsor Locks, Conn.; Clive Frederick George Dupen, San Diego, Calif., and Richard Croissant Noyes, Hartford, Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Jan. 2, 1974, Ser. No. 430,292
Int. Cl.² G21C 19/20
U.S. Cl. 176—30 **5 Claims**

1. In combination, a liquid metal cooled nuclear reactor and a fuel handling machine for the reactor, said reactor including: a vessel containing liquid metal coolant; a core surrounded by said coolant, said core containing a plurality of fuel subassemblies, the level of coolant above said subassemblies being at

least equal to the length of the subassemblies; a closure head for said vessel having an entrance port therein; said fuel handling machine comprising: control and drive assembly means positionable above and spaced from said entrance port; a tubular barrel extending down from said control and drive assembly means; a seal valve attached to the bottom of said barrel for making sealed communication with said entrance port, said communication extending into said barrel; a handling tube mounted within said barrel for passing through said entrance port into said reactor and defining an annular space between said tube and said barrel; a closure valve in the bottom of said handling tube through which a fuel subassembly may be passed; means for opening and closing said closure valve; means extending from said control and drive assembly means for lowering said handling tube into said vessel to a position adjacent to the upper end of said fuel subassemblies and for retracting said handling tube back into said tubular



barrel; gripper means vertically movable within said handling tube for being lowered and extended down through said open closure valve for engaging a selected fuel subassembly; means extending from within said control and drive assembly means, through said handling tube, for raising and lowering said gripper means; heat transfer means for continuously removing heat from liquid metal trapped within said handling tube; whereby upon engaging said seal valve with said entrance port, lowering said handling tube into said reactor, opening said closure valve, lowering said gripper means to a position adjacent a subassembly, engaging said subassembly with said gripper means, raising said gripper means to draw said subassembly into said handling tube, closing said closure valve, and raising said handling tube into said barrel, said fuel subassembly is contained in said handling tube immersed in liquid metal coolant which has been captured in said tube and is cooled by said heat transfer means.

4,002,530

6-AMINOPENICILLANIC ACID DERIVATIVE

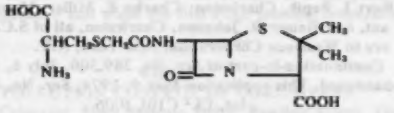
Hugo Troonen, Hoeilaart; Piet Roelants, Watermaal-Bosvoorde, and Bernard Boon, Ohain, all of Belgium, assignors to Recherche et Industrie Therapeutiques (R.I.T.), Belgium

Division of Ser. No. 449,180, March 7, 1974, Pat. No. 3,883,511. This application Jan. 9, 1975, Ser. No. 539,900

Int. Cl.² C12D *9/08*

U.S. Cl. 195—36 P **3 Claims**

1. A method of producing the compound 6-[(D)-(2-amino-2-carboxyethylthio)acetamido]penicillanic acid of the formula



which comprises cultivating Acremonium chrysogenum ATCC 20,389 in a culture medium containing assimilable sources of carbon and nitrogen, inorganic salts, L-lysine, and L-carboxymethylcysteine under submerged aerobic conditions until a substantial amount of the said compound is produced.

4,002,531

MODIFYING ENZYMES WITH POLYETHYLENE GLYCOL AND PRODUCT PRODUCED THEREBY

Garfield P. Royer, Worthington, Ohio, assignor to Pierce Chemical Company, Rockford, Ill.

Filed Jan. 22, 1976, Ser. No. 651,240

Int. Cl.² C07G *7/02*

U.S. Cl. 195—68 **1 Claim**

1. A process for the preparation of the monoalkyl polyethyleneglycol derivative of an enzyme containing free amino groups comprising reductively alkylating the free amino groups of the enzyme with the aldehyde derivative of a monoalkyl polyethyleneglycol.

4,002,532

ENZYME CONJUGATES

Joel K. Weltman, 4 Wildacre Lane, Barrington, R.I. 02806, and M. Boris Rotman, 11 Mayflower St., Providence, R.I. 02906

Filed Oct. 21, 1974, Ser. No. 516,331

Int. Cl.² G01N *31/14*; C07G *7/02*

U.S. Cl. 195—103.5 A **16 Claims**

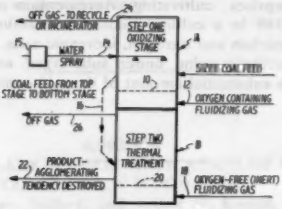
1. A process for producing an enzyme conjugate with other non-enzyme proteinaceous macromolecules which consists essentially of reacting together an enzyme; a poly-functional coupling agent selected from the group consisting of diisocyanates, carbodiimides, p,p′-di-fluoro-m,m′-dinitrodiphenylsulfone, glutaraldehyde, dimethyladipimate, formaldehyde, bis-diazobenzidine and aromatic halide disulfonates; a polyamine selected from the group consisting of albumin or a diamine selected from a group consisting of phenylenediamine, 4.4′-diaminobenzophenone, p,p′-diaminodiphenyl methane, naphthalene diamine, benzidine, 2,6-diaminopurine, ethylene diamine, propylene diamine diaminodipropylamine and hexamethylene diamine; and a non-enzyme proteinaceous macromolecule selected from the group consisting of antibodies, antigens, allergens and hormones under conditions which preserve enzymatic activity and form said enzyme conjugate.

12. A process for the detection of antibodies which includes the steps of adhering to a solid support, material which specifically binds antibodies to be detected, adding a body fluid to said adhered material to band antibodies therein to the adhered material, washing the support to remove unbound components of the body fluid, adding the enzyme conjugate of claim 7 to said washed support whereby the conjugate becomes bound to the solid support in proportion to the amount of bound antibodies, washing the support to remove unbound conjugate, and determining the presence of bound antibodies by determining enzymatic activity of said conjugate.

4,002,533
TWO-STEP PROCESS FOR CONDITIONING SIZED COAL AND RESULTING PRODUCT

Albert J. Repik, Charleston; Charles E. Miller, Mount Pleasant, and Homer R. Johnson, Charleston, all of S.C., assignors to Westvaco Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 269,300, July 6, 1972, abandoned. This application May 9, 1974, Ser. No. 468,616
Int. Cl.² C10L 9/06
U.S. Cl. 201—1 6 Claims



1. A process for conditioning high volatile coal particles to be used for making activated carbon or obtaining a synthesis gas consisting essentially of:

a. sizing the coal to a particulate size in the range of b 6 to 325 mesh;

b. fluidizing said sized high volatile coal particles with an oxidizing medium containing from about 2% to about 21% oxygen by volume at a temperature in excess of about 500° F. but less than the fusion temperature of said coal particles for from about 10 minutes to 1 hour until the particles have an oxygen pickup value of from about 0.1 to about 0.25 pounds of oxygen per pound of coal, which is insufficient to render the particles non-agglomerative;

c. spraying water directly onto said fluidized coal particles being oxidized for maintaining the oxidizing temperature within ±5° F. of the desired temperature; and

d. fluidizing said oxidizing particles in a non-oxidizing atmosphere and thermally treating the particles at a temperature in excess of about 750° F. but less than about 1,000° F. to render said particles non-agglomerative and having at least 15% by dry weight of volatiles.

4,002,534
CONTINUOUS COKING PROCESS

Roland Rammler, Konigstein, Taunus, and Paul Lange, Frankfurt am Main, both of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 278,679, Aug. 7, 1972, abandoned. This application July 23, 1974, Ser. No. 491,029
Claims priority, application Germany, Aug. 20, 1971, 2141876
Int. Cl.² C10B 53/08, 47/20, 51/00
U.S. Cl. 201—6 9 Claims

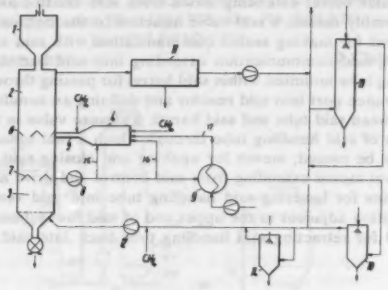
1. Coking process for converting shaped fuel bodies into shaped coke bodies having high mechanical strength, said shaped fuel bodies containing about 6–14% volatile constituents and being selected from the group consisting of briquettes and pellets made by hot-briquetting or hot-pelletizing fine-grained coke and fine grained caking coal, which comprises:

i. continuously coking said shaped fuel bodies which bodies are at temperatures above 750° C in a shaft oven by direct heating with a hot scavenging gas;

ii. producing said scavenging gas by partial combustion of the coking gas and conducting same upward through the shaft oven countercurrent to the descending shaped fuel bodies;

iii. adding to the hot scavenging gas, before it enters the shaft oven, a reactive material selected from the group consisting of flue dust and high hydrocarbon gases in an amount corresponding to 0.5–3% of the coke throughput; and

iv. at least partly consuming gasifying agents carbon dioxide and steam in the hot scavenging gas before it enters the shaft oven by reacting said gasifying agents with said

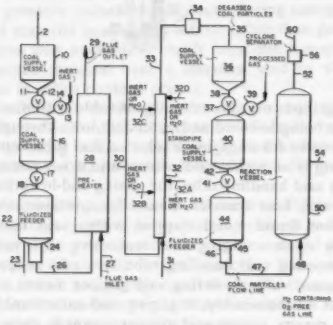


reactive material thereby avoiding detrimental endothermic gasification reactions which would otherwise attack the structure of the shaped coke bodies.

4,002,535
PRECONDITIONING TREATMENT OF COAL TO MINIMIZE AGGLOMERATION

Charles William Albright, South Charleston, and Hubert Greenidge Davis, Charleston, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 27, 1974, Ser. No. 536,870
Int. Cl.² C10B 57/08; C10L 9/06
U.S. Cl. 201—9 10 Claims



1. A method of preconditioning coal particles to substantially prevent agglomeration of said particles in a fluid-bed reaction zone of a reactor comprising:

a. preheating a dense phase flow of said particles in the absence of oxygen to a first predetermined temperature between about 280° C and about 420° C for a preheat time sufficiently brief to avoid significant agglomeration of said particles;

b. preheating an oxygen-containing gas to a temperature substantially equal to said first predetermined temperature;

c. introducing said preheated particles and said preheated gas into a vertically elongated standpipe in an upwards direction, said gas having a superficial gas velocity greater than the free fall velocity of the largest of said coal particles, the amount of oxygen in said gas and said superficial gas velocity being controlled so that said oxygen is substantially consumed exothermically, the amount of said oxygen in said gas being between about 0.5 and about 6 weight percent of said particles the exothermic oxidation increasing the temperature of said particles up to 80° C

per weight percent oxygen to said particles, said particles leaving said standpipe in about 20 seconds to about 300 seconds;

d. regulating the oxidation temperature of said particles within said standpipe to a second predetermined temperature between about 380° C and about 480° C, a temperature within the plastic transformation-temperature of said particles;

e. introducing said oxidized particles at said second predetermined temperature into a cooling zone wherein the temperature of said particles is regulated to a third predetermined temperature between about 300° C and about 400° C;

f. pressurizing said oxidized particles to a pressure above the pressure in said reaction zone; and

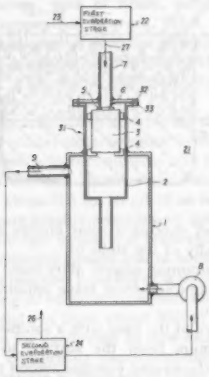
g. introducing said particles into said reaction zone, whereby agglomeration of said particles in said zone is substantially prevented as said particles react at reaction pressure with a reagent.

4,002,536

ARRANGEMENT FOR PREVENTING UNDESIRED FLUID BACKFLOW DURING START-UP AND SHUTDOWN OF TWO-STAGE EVAPORATION INSTALLATIONS

Gundolf E. Rajakovics, Vienna, Austria, assignor to Vereinigte Edelstahlwerke AG, Vienna, Austria

Filed Jan. 23, 1975, Ser. No. 543,421
Claims priority, application Austria, Jan. 25, 1974, 639/74
Int. Cl.² B01D *1/30*
U.S. Cl. 202—173 **6 Claims**



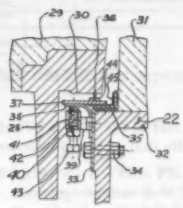
1. In a two-stage evaporation installation for the purification of liquids, wherein a mixing condenser is disposed intermediate first and second evaporation stages, the first stage being normally maintained at a pressure above that of the second stage, and a pump for normally forcing a portion of the liquid from the second stage to the mixing condenser; and wherein vapor generated in the first stage is conducted via a first conduit to the mixing condenser where such vapor is condensed by contact with the portion of the liquid of the second stage that is forced into the mixing condenser by the pump, the first conduit being disposed so that the liquid is maintained at a first level in the first conduit when both the first stage and the pump are inoperative, the liquid in the first conduit being displaced by the vapor coming from the first stage when said first stage is operative, an improved arrangement for preventing backflow of liquid through the first conduit to the first stage when said pump is operative and said first stage is inoperative, which comprises float valve means disposed in said conduit and separating said first conduit into a first section originating in the first stage and into a second section leading to the mixing condenser, said float valve means being open when the first conduit exhibits the first liquid level, said float valve means closing upon a rise in the liquid level from the first level resulting from the forcing of liquid into the second section of the first conduit by the pump when the pump is made operative and while the first stage remains inoperative.

4,002,537

POLLUTION CONTROL OF COKE OVENS

Albert Calderon, 1065 Melrose Drive, Bowling Green, Ohio 43402

Filed Sept. 30, 1974, Ser. No. 510,659
Int. Cl.² C10B *25/16*
U.S. Cl. 202—248 **11 Claims**



1. Apparatus comprising a coke oven door having a seal assembly for sealing a space between a coke oven door and door jamb when the door is disposed in a position in which it substantially closes an opening in a coke oven, said seal assembly comprising a pressure plate connected to said door, and having a first surface facing toward the jamb and a second surface facing away from the jamb when the door is in the position in which it substantially closes the opening in the oven, said pressure plate further including inner and outer surfaces joining the first and second surfaces, first seal means connected with said first surface of said pressure plate for sealingly engaging a surface of the door jamb which faces the first surfaces of the pressure plate, positioning means for moving said pressure plate in a path extending perpendicular to the first and second surfaces of the pressure plate to press said first seal means into sealing engagement with the door jamb, said positioning means being effective to move said pressure plate along said path between a retracted position in which the pressure plate is closely adjacent to a portion of the door and an extended position in which the pressure plate is spaced from the portion of the door while maintaining said first and second surfaces of said pressure plate perpendicular to the path of movement of said pressure plate.

4,002,538

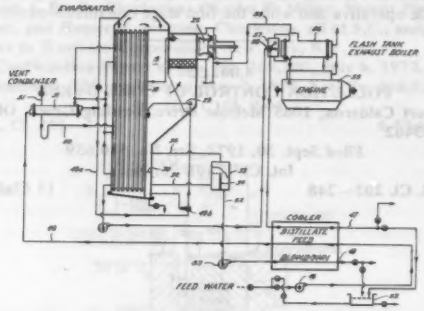
DISTILLATION APPARATUS AND METHOD

John E. Pottharst, Jr., 861 Carondelet St., New Orleans, La. 70130

Continuation-in-part of Ser. No. 414,293, Nov. 9, 1973, abandoned. This application Aug. 5, 1974, Ser. No. 494,891
Int. Cl.² B01D *3/00, 3/10*
U.S. Cl. 203—10 **10 Claims**

1. A method of distilling brackish water or seawater using a vertical shell and tube vaporizer including an array of tube having a width substantially greater than its depth comprising the steps of establishing a body of water at the lower end of the vaporizer along substantially the entire width of said array and with a level such as to extend into the lower end of said tubes to be heated therein in such a manner that the discharge from the upper ends of the tubes is a frothy mixture of vapor and liquid, compressing such vapor and then passing it in heat exchange relation with the water being vaporized in said tubes, flowing the liquid discharged from the upper ends of said tubes laterally to one side of the array of tubes and then downwardly into said body of water along a major portion of its width; flowing feed water into said body of water adjacent one end of said array and flowing blowdown from said body of

water adjacent the other end of said array; whereby the concentration of dissolved salts in said body of water increases



from substantially that of the feed water at said one end of the array to substantially that of the blowdown at the other end of the array.

4,002,539

RECOVERY OF CARBOXYLIC ACIDS FROM OXO RESIDUES

Max Strohmeyer, Limburgerhof; Werner Hagen, Heidelberg, and Heinz Hohenschutz, Mannheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Sept. 23, 1974, Ser. No. 508,162

Claims priority, application Germany, Oct. 6, 1973, 2350313

Int. Cl.² B01D *3/34*

U.S. Cl. 203—34 **8 Claims**

1. A process for isolating a carboxylic acid selected from the group consisting of propionic acid and butyric acid from the residue which is obtained in the production of propanol or butanol by the catalytic hydroformylation of ethylene or propylene, subsequent hydrogenation of the resulting crude propionaldehyde or butyraldehyde, treatment of the hydrogenated product mixture with an aqueous alkali metal hydroxide solution in order to saponify propyl propionate or butyl butyrate formed as a byproduct and distilling off the propanol or butanol product, said residue consisting essentially of high-boiling alcohols, water and alkali metal propionate or butyrate, which process comprises:

acidifying said residue with a strong mineral acid selected from the group consisting of sulfuric acid and hydrochloric acid to form the corresponding alkali metal sulfate or chloride, the amount of acid being sufficient to yield a mixture with a pH of from 2 to 4 with the proviso that the resulting acidified mixture does not contain more than 5 parts by weight of water per part by weight of the propionic or butyric acid;

separating the organic phase thus obtained from the aqueous phase; and

isolating propionic or butyric acid by distillation from the organic phase.

4,002,540

SCREEN HAVING PARALLEL SLOTS

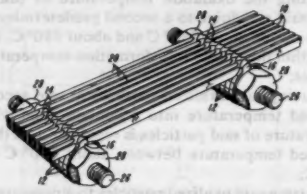
Leon C. Bixby, Owensboro, Ky., assignor to Hendrick Manufacturing Company, Carbondale, Pa.

Division of Ser. No. 496,094, Aug. 9, 1974. This application June 16, 1975, Ser. No. 587,258

Int. Cl.² C25D *7/00, 3/04*

U.S. Cl. 204—24 **4 Claims**

1. In the method of forming an interflexing screen which may be vibrated in use which comprises the steps of forming loops spaced apart along the length of a plurality of wires, and assembling said wires on support rods passing through said loops, the improvement including the step of lubricating the surfaces of said wires which will contact adjacent wires after



the foregoing assembly by electrolytically depositing hard chrome on said screen wires after the same are looped and before the same are assembled into a screen.

4,002,541

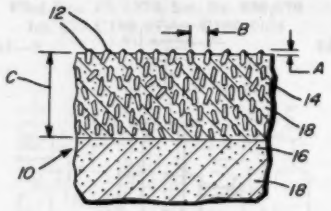
SOLAR ENERGY ABSORBING ARTICLE AND METHOD OF MAKING SAME

George W. Streander, Alamogordo, N. Mex., assignor to Design Systems, Inc., Alamogordo, N. Mex.

Continuation-in-part of Ser. No. 303,393, Nov. 3, 1972, abandoned, which is a continuation-in-part of Ser. No. 210,072, Dec. 22, 1971, abandoned. This application Jan. 31, 1975, Ser. No. 545,735

Int. Cl.² C25D *5/44*

U.S. Cl. 204—33 **18 Claims**



17. A method of making a solar energy absorbing article consisting essentially of the steps of:

providing an aluminum-silicon alloy base having predominantly aluminum and from trace amounts up to 18% by weight silicon;

treating a surface of the base with a solution that selectively etches aluminum from the surface to provide etched aluminum surfaces and exposes silicon surfaces between the etched aluminum surfaces that protrude above the etched aluminum surfaces; and

anodizing the exposed protruding silicon surfaces and etched aluminum surfaces to grow silicon dioxide crystals and an aluminum oxide supporting matrix layer from the etched aluminum surface so that the silicon dioxide crystals are embedded in, protrude from a surface of said matrix layer and are substantially perpendicular to said matrix layer to conduct solar energy to said alloy base and said aluminum oxide matrix layer forms a physical and chemical bond with the original surface of said alloy base treated by said solution.

4,002,542

THIN FILM CAPACITOR AND METHOD

Peter L. Young, Horseheads, N.Y., assignor to Corning Glass Works, Corning, N.Y.

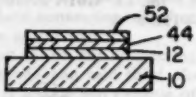
Filed Feb. 9, 1976, Ser. No. 656,525

Int. Cl.² C25D *5/00;* **C23C** *15/00;* **H01G** *7/00*

U.S. Cl. 204—38 A **5 Claims**

1. A method of forming a capacitor comprising the steps of providing a dielectric substrate,

applying to said dielectric substance a non-tantalum electrically conductive film to form a first capacitor electrode,
disposing said substrate and conductive film within a vacuum environment,
applying a film of tantalum oxide of desired thickness over said conductive film within said vacuum environment,
removing said composite so formed from said vacuum environment



providing a liquid anodizing bath, thereafter
disposing said composite in said liquid anodizing bath,
passing an electrical current through said tantalum oxide film, said current being substantially constant until a predetermined desired voltage is reached, and
removing said composite from said anodizing bath.

2. The method of claim 1 wherein said film of tantalum oxide was applied by r-f sputtering.

4,002,543

ELECTRODEPOSITION OF BRIGHT NICKEL-IRON DEPOSITS

Richard John Clauss, Allen Park, and Robert Arnold Tremmel, Woodhaven, both of Mich., assignors to Oxy Metal Industries Corporation, Warren, Mich.

Continuation-in-part of Ser. No. 456,032, April 1, 1974, abandoned. This application May 6, 1975, Ser. No. 575,092

Int. Cl.² C25D *3/56, 5/12*

U.S. Cl. 204—41 **15 Claims**

1. An aqueous acidic bath suitable for the electrodeposition of a bright iron-nickel electrodeposit onto a substrate susceptable to corrosion, which comprises iron ions and nickel ions, the ratio of nickel ions to iron ions being from about 5 to about 50 to 1, about 0.5 to 10 g/l of an organic sulfo-oxygen compound, a bath soluble complexing agent in the amount of about 10 to 100 g/l which is a carboxylic acid having both carboxyl and hydroxyl groups and in addition, about 0.1 mg/l to 25 mg/l of a reaction product of a polyalkylene polyamine and an alkylating or sulfonating agent, said polyamine having a molecular weight of from about 300 to 24,000.

13. A process for producing an iron-nickel alloy, chromium coated article comprising electrodepositing an iron nickel alloy onto a substrate in the bath of claim 1 and subsequently electrodepositing chromium upon the iron-nickel coating.

4,002,544

HYDROMETALLURGICAL PROCESS FOR THE RECOVERY OF VALUABLE COMPONENTS FROM THE ANODE SLIME PRODUCED IN THE ELECTROLYTICAL REFINING OF COPPER

Seppo Olavi Heimala; Olli Viljo Juhani Hyvarinen; Jorma Pentti Eenokki Kinnunen, all of Pori, and Heikki Aukusti Tiitinen, Ulvila, all of Finland, assignors to Outokumpu Oy, Helsinki, Finland

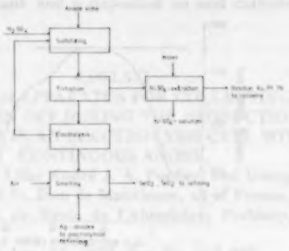
Filed Oct. 1, 1975, Ser. No. 618,510

Claims priority, application Finland, Apr. 3, 1975, 991/75

Int. Cl.² C25C *1/20, 1/22*

U.S. Cl. 204—109 **5 Claims**

1. A hydrometallurgical process for the recovery of silver, selenium and tellurium from anode slime from copper or lead bearing raw materials, in which the raw material and concentrated sulfuric acid or oleum are heated at approximately 160°–300° C, to dissolve Ag, Se, Te and Ba, comprising separating the concentrated sulfuric acid containing the silver, selenium, barium and tellurium dissolved from the raw material and treating said sulfuric acid separately for recovering Ag, Se, and Te.



4,002,545

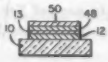
METHOD OF FORMING A THIN FILM CAPACITOR

Francis P. Fehiner, Corning; Arthur J. Whitman, Elmira, and Peter L. Young, Horseheads, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Feb. 9, 1976, Ser. No. 656,526

Int. Cl.² C23C *15/00;* **H01G** *7/00*

U.S. Cl. 204—192 **10 Claims**



1. A method of forming a capacitor comprising the sequential steps of providing a dielectric substrate,
applying to said dielectric substrate a non-tantalum electrically conductive film to form a first capacitor electrode,
applying over said electrode a thin film of tantalum which together with said electrically conductive film forms a duplex film,
disposing said substrate and said duplex film within a vacuum environment containing an oxygen-inert gas mixture,
r-f sputtering a film of tantalum oxide of desired thickness over said duplex film within said vacuum environment, said tantalum oxide being sputtered from a tantalum oxide target,
cooling said dielectric substrate and duplex film while said film of tantalum oxide is being sputtered thereon, and thereafter
applying an electrically conductive film over said film of tantalum oxide to form a counter capacitor electrode.

4,002,546

METHOD FOR PRODUCING A MAGNETIC RECORDING MEDIUM

Ryuji Shirahata; Tatsuji Kitamoto, and Masaaki Suzuki, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Dec. 10, 1975, Ser. No. 639,493

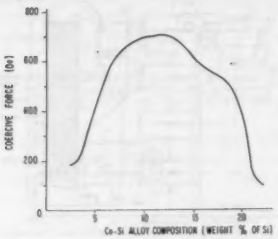
Claims priority, application Japan, Dec. 10, 1974, 49-142160

Int. Cl.³ C23C *15/00;* **B05D** *5/12*

U.S. Cl. 204—192 **6 Claims**

1. In the method of forming a magnetic recording medium comprising a support carrying a magnetic thin film thereon which comprises ion plating a magnetic alloy from an evaporation source onto a support, the polarities of said evaporation

source and said support being positive and negative, respectively, in an inert gas atmosphere by applying a high tension



voltage between said evaporation source and said support, the improvement wherein said magnetic alloy consists essentially of Co and Si.

4,002,547

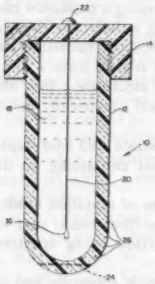
ELECTROCHEMICAL REFERENCE ELECTRODE

Radhakrishna M. Neti, Brea, and Colin C. Bing, Placentia, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Continuation of Ser. No. 65,898, Aug. 21, 1970, abandoned, which is a continuation-in-part of Ser. No. 818,935, April 24, 1969, abandoned. This application July 22, 1974, Ser. No. 490,544

Int. Cl.² G01N *27/40*, *27/46*

U.S. Cl. 204—195 F **4 Claims**



1. An electrochemical reference electrode comprising:

an electrode body of liquid impermeable polymeric material, said electrode body forming a closed internal chamber;

a water soluble salt selected from the group consisting of potassium chloride, sodium chloride, and potassium nitrate distributed through at least a portion of said liquid impermeable polymeric material to form a liquid junction structure in said electrode body, at least some of said water soluble salt being in particulate form and being held in place by a filamentary coating of said polymeric material;

an internal half cell disposed in said chamber;

means for making an electrical connection to said internal half cell; and,

an internal filling solution in said internal chamber;

said electrode having no path for leakage of a test solution into said internal chamber or for leakage of said internal filling solution into a test solution when said electrode is immersed in a test solution.

4,002,548

ACTIVE GRIGNARD ELECTRODE

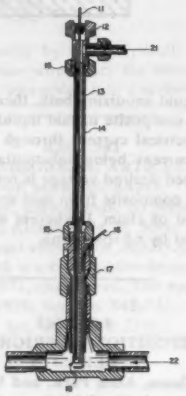
Charles L. Baimbridge, Sweeny; James R. Minderhout, Lake Jackson; Robert W. Bearman, Lake Jackson, and Donald E. Carpenter, Lake Jackson, all of Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.

Division of Ser. No. 342,346, Mar. 19, 1973, Pat. No. 3,925,169

Filed June 27, 1975, Ser. No. 590,836

Int. Cl.² G01N *27/30*, *27/46*

U.S. Cl. 204—195 F **4 Claims**



1. A reference half cell comprising a housing containing $PbCl_2$, $MgCl_2$, anhydrous solvent/Pb° and a porous member connected to said housing acting as a bridge.

4,002,549

APPARATUS AND METHOD FOR CONTINUOUS ELECTROLYTIC COLORING OF ALUMINUM ARTICLES

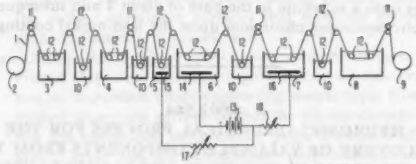
Kiyomi Yanagida; Tadashi Hirokane; Tadashi Tsukiyasu, and Tomoari Sato, all of Nagoya, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Mar. 11, 1974, Ser. No. 450,259

Claims priority, application Japan, Mar. 9, 1973, 48-28143

Int. Cl.² E25D *17/00*

U.S. Cl. 204—211 **2 Claims**



1. An apparatus for the continuous electrolytic coloring of an aluminum strip or wire comprising:

means for continuously supplying an aluminum strip or wire;

current supplying bath means for supplying direct current to said aluminum strip or wire and having a first electrode as an anode disposed therein;

a degreasing bath and an etching bath disposed in that order between said supply means and said current supplying bath;

anodic oxidation bath means for anodizing said aluminum strip or wire and having a second electrode as a cathode disposed therein;

electrolytic coloring bath means for electrolytically coloring

said aluminum strip or wire and having a third electrode as an anode disposed therein;

a sealing bath positioned to receive said strip or wire subsequent to passing through said electrolytic coloring bath;

a direct electric current power source;

first electric circuit means for connecting said first electrode as an anode and said second electrode as a cathode to said power source and capable of causing said aluminum strip or wire to function as an anode in said anodic oxidation bath without connecting said aluminum strip or wire directly to the power source;

second electric circuit means for connecting said second electrode as a cathode and said third electrode as an anode to said power source and capable of causing said aluminum strip or wire to function as an anode in said anodic oxidation bath and said aluminum strip or wire to function as a cathode in said electrolytic coloring bath without connecting said aluminum strip or wire directly to the power source;

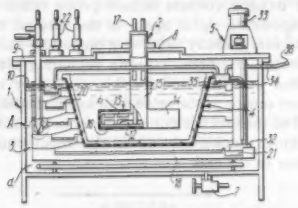
a plurality of wash baths, said baths being interspersed between said degreasing bath and said etching bath, between said etching bath and said current supplying bath, between said anodic oxidation bath and said electrolytic coloring bath, and between said electrolytic coloring bath and said sealing bath; and,

means for passing said aluminum strip or wire continuously and successively through said baths in the order recited.

4,002,550
ELECTROLYZER FOR PRODUCING AND REFINING METALS

Svetoslav Georgievich Smirnov, Davydkovskaya ulitsa, 22, kv. 88; Nadezhda Semenovna Gorbacheva, Tishinskaya ploschad, 6, kv. 51, both of Moscow; Ljubov Valentinovna Ershova, ulitsa Sadovaya, 13, kv. 48, Boxitogorsk Leningradskoi oblasti; Nina Andreevna Ljubimova, 11 Parkovaya ulitsa, 44, korpus 4, kv. 36, Moscow; Galina Grigorievna Pestova, ulitsa Zavodskaya, 5, kv. 30, Boxitogorsk Leningradskoi oblasti; Nina Pavlovna Selekhova, Bolshaya Cherkizovskaya ulitsa, 6, korpus 9, kv. 61, Moscow; Margarita Ilinichna Smirnova, Bolshaya Cherkizovskaya ulitsa, 6, korpus 9, kv. 61, Moscow; Alexandr Vladimirovich Tiflov, Birjulevskaya ulitsa, 11, korpus 2, kv. 246, Moscow, and Nina Alexeevna Fomina, Nagatinskaya naberezhnaya, 18, kv. 92, Moscow, all of U.S.S.R.

Filed Apr. 15, 1975, Ser. No. 568,369
Int. Cl.² C25C *7/00, 7/02, 7/04*
U.S. Cl. 204—222 **4 Claims**

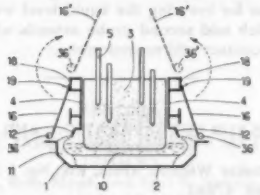


1. An electrolyzer for producing and refining a metal from its liquid alloy, comprising: an electrolyte tank closed by covers; a cathode made of a refined metal and having a current lead; a device for holding said cathode in said tank; means for receiving the metal being refined, independent from said tank, and being in the form of a plurality of shelves arranged in a stepped relationship, having a box-shaped cross-section and being installed horizontally about said cathode and with a clearance relative to the inner surface of said tank; an anode made of the metal being refined, disposed over said shelves about said cathode; and a pump to feed the metal being refined from the bottom of said tank to a top shelf of said receiving means; wherein the metal being refined is fed by said pump onto said top shelf, and on flowing by gravity down over said shelves, the metal is dissolved electrochemically in the electrolyte of said tank and is deposited on said cathode as the refined metal.

4,002,551
PROCESS AND APPARATUS FOR COLLECTING THE FUMES GIVEN OFF DURING THE PRODUCTION OF ALUMINIUM IN AN ELECTROLYSIS CELL WITH A CONTINUOUS ANODE

Daniel Duclaux, Lille; André J. A. Pontier, and Georges Paul Ferret, both of St. Jean de Maurienne, all of France, assignors to Societe de Vente de l'Aluminium Pechiney, Lyon, France

Filed Apr. 17, 1975, Ser. No. 569,080
Int. Cl.² C25C *3/06, 3/22, 7/00*
U.S. Cl. 204—247 **7 Claims**

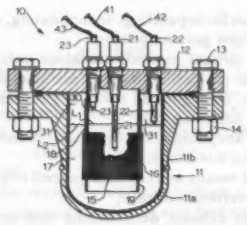


1. An apparatus for collecting fumes produced during the fabrication of aluminum in a continuous anode electrolysis vat formed of a carbonaceous mass enclosed in a sheath and immersed into an electrolysis bath housed within a tank which is sealed at its lower portion by a cathode, said apparatus comprising a hood means, a longitudinal movable panel on opposite sides of the tank lining the surface of the electrolysis bath between the sheath of the anode and the tank, said panel having a sealing gasket on its upper side while its lower side is spaced a short distance from the edge of the tank to permit a slight ingress of air, a fixed member mounted on the vat head, the lateral closing of which is assured with interposition of the sealing gaskets by the panels, a pipe conduit communicating the space delimited above the vat head by the fixed parts of the hood means and the panel to a gas treatment installation.

4,002,552
LIQUID LEVEL CONTROL SYSTEM

Julian W. Bunn, Jr., Raleigh, N.C., and Charles O. Buckley, Lewisburg, W. Va., assignors to Trienco, Inc., Raleigh, N.C.

Filed Sept. 19, 1975, Ser. No. 614,755
Int. Cl.² C25B *1/02, 15/02, 1/12*
U.S. Cl. 204—266 **9 Claims**



1. In a pressurized vessel containing a volume of conductive liquid and having partition means therein defining a pair of spaces each having its own liquid level, said partition means serving to isolate an upper pressurized gas filled area within

each of said spaces and said partition means being adapted to allow liquid flow from one space to another without allowing intermixing of the gases within said upper pressurized areas whereby the respective liquid levels in said spaces are interdependent and vary according to the relative pressures maintained in said upper pressurized areas, a system for controlling the respective levels of said liquid within each of said pair of spaces, comprising in combination:

a. a first constant level electrode probe extending downwardly into said vessel and terminating at a point defining the desired constant liquid level to be maintained within the space into which said first probe extends, said first probe being electrically connected through associated circuitry to means for introducing liquid into said vessel when said liquid drops below said first probe; and

b. a second high level electrode probe extending downwardly into said vessel and terminating at a point defining the upper limit for the liquid level within the space into which said second probe extends, said second probe being electrically connected through associated circuitry to means for lowering the liquid level within the space into which said second probe extends when such level rises to contact said second probe.

4,002,553

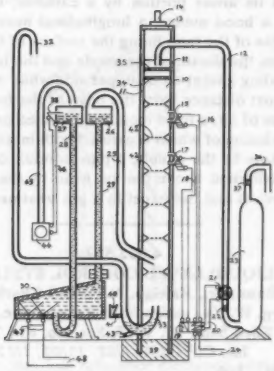
APPARATUS FOR THE SEPARATION, AND STORAGE OF HYDROGEN GAS

Friedrich Ottokar Wilhelm Arntz, Rte. No. 1 Summit Grove, Clinton, Ind. 47842

Continuation-in-part of Ser. No. 586,648, June 13, 1975, abandoned. This application Mar. 4, 1976, Ser. No. 663,783

Int. Cl.² C25B *1/02, 1/04*

U.S. Cl. 204—278 **10 Claims**



1. Apparatus for separating, accumulating, compressing and storing hydrogen gas comprising:

a vertical, airtight gas cell container column wherein the individual gas cell containers are stacked one on top of the other, each gas cell being in gaseous communication with the adjoining cell;

a means to keep said gas cells separated from each other yet in gaseous communication;

a structural means to keep said gas cell container column in a stable vertical position;

a waste gas exhaust duct exiting said gas cell container column at an elevation at or near it's bottom said waste gas exhaust duct within it's bottom segment including a means to effect a check valve effect;

a segment at the bottom of waste gas exhaust duct at the exit point out of gas cell container column having a U-tube configuration wherein the bottom part of said U-shaped duct is kept filled with a volume of liquid which assumes the function of a check valve;

a motor compressor pump connected to a hydrogen outlet suction duct exiting at the top of aforesaid gas cell container column aforesaid motor compressor pump pumping hydrogen gas periodically into a storage tank wherein a check valve is inserted into the duct connection between motor compressor pump and the storage tank;

a gas mixture input feed duct discharging into the gas cell container column at an elevation near the lower segment of said gas cell container column;

a means to channel electric signals in conjunction with electric feed current switching mechanism to hydrogen motor compressor which means are connected by control connections to two oxygen content sensor probe relais units inserted into two gas cells in the uppermost segment of the gas cell container column and containing switching mechanism for turning off respectively on supply current to the motor compressor pump aforesaid means to channel electric signals in conjunction with electric feed current switching mechanism, said switching mechanism turning off respectively on supply current to the motor compressor pump depending on which sensing signal it receives;

two oxygen content sensor probe relais units inserted into two gas cell containers in the uppermost segment of the gas cell container column in such a manner that the first oxygen content sensor probe relais unit is inserted into a gas cell within the upper segment of the gas cell container column, which gas cell is located at an elevation below the elevation of yet another gas cell of said gas cell container column, which said other gas cell has inserted into it the second and upper oxygen content sensor probe relais unit;

and a preprogrammed arrangement of functions wherein the first or lower oxygen content sensor probe relais unit upon finding no traces of oxygen within the gas cell it is inserted into sends a signal to the electric control means which effects the switching on of supply current to the motor compressor pump and wherein the second or upper oxygen content sensor probe relais unit upon subsequently finding traces of oxygen within the gas cell it is inserted into sends a signal to the electric control means which effects the switching off of the supply current to the motor compressor pump thereby stopping the hydrogen pumping action until the hydrogen content is concentrated enough again to repeat the pumping cycle of the compressor, further wherein upon sensing a complete absence of oxygen in it's gas cell after the hydrogen in the upper gas cell containers has been replenished the first or lower oxygen content sensor probe relais unit sends a corresponding signal again to the electric control signal conductors thereby switching on supply current again to the motor compressor pump repeating aforementioned function and followed by the second or upper oxygen content sensor probe relais unit again sending a switch-off signal to the electric control signal conducting means and switching mechanism upon the recurrence of oxygen dilution in it's cell.

4,002,554

PROCESS OF MINIMIZING OR PREVENTING FOULING

Magne Borge, Rosieres, and Torger Lode, Overijse, both of Belgium, assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Oct. 8, 1974, Ser. No. 513,078

Claims priority, application United Kingdom, Oct. 17, 1973, 48266/73

Int. Cl.² C10G *9/16*

U.S. Cl. 208—48 AA **6 Claims**

1. A process for minimizing the fouling in the internal surface area of a metallic heating unit into which a hydrocarbon feedstock comprising a member selected from the group con-

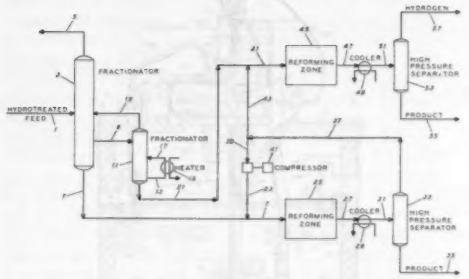
sisting of C_4 diolefins, C_5 diolefins or mixtures thereof is introduced, which comprises the steps of:

1. purging said heating unit with an inert gas,
2. introducing from 0.15 to 500 gm. of nitric oxide per square meter of the internal surface area into said heating unit purged in step (1),
3. purging said heating unit passivated in step (2) with an inert gas, and, thereafter,
4. introducing the hydrocarbon feedstock into said heating unit purged in step (3) with said heating unit being at an elevated temperature.

4,002,555
HYDROCARBON REFORMING PROCESS

Robert A. Farnham, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jan. 7, 1976, Ser. No. 647,035
Int. Cl.² C10G *35/08, 39/00*
U.S. Cl. 208—80 **9 Claims**



1. A process for reforming a first hydrocarbon feedstock and a second hydrocarbon feedstock, which comprises the steps of:

a. contacting said first feedstock and hydrogen with a reforming catalyst in a first reforming zone at reforming conditions including a first reforming pressure;

b. separating a hydrogen-rich gas and a first liquid hydrocarbon product from the effluent from said first reforming zone at a separation pressure below said first reforming pressure;

c. recycling a first portion of said hydrogen-rich gas to provide at least a portion of the hydrogen passed into said first reforming zone;

d. contacting said second feedstock and a second portion of said hydrogen-rich gas with a reforming catalyst in a second reforming zone at reforming conditions including a second reforming pressure lower than said first reforming pressure, with all the hydrogen gas introduced into said second reforming zone being provided solely from said hydrogen-rich gas; and

e. recovering a second hydrocarbon product from the effluent from said second reforming zone.

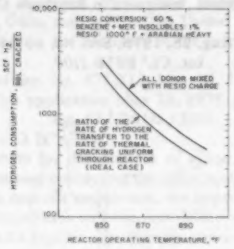
4,002,556
MULTIPLE POINT INJECTION OF HYDROGEN DONOR DILUENT IN THERMAL CRACKING

Donald P. Satchell, Jr., Morenci, Ariz., assignor to Continental Oil Company, Ponca City, Okla.

Filed Apr. 12, 1976, Ser. No. 675,841
Int. Cl.² C10G *9/14, 13/00, 1/06*
U.S. Cl. 208—107 **5 Claims**

1. In a conversion process wherein a heavy petroleum residuum is subjected to hydrogen donor diluent cracking conditions in the presence of a hydrogen donor diluent material in a cracking unit, the improvement comprising:

adding a first portion of the hydrogen donor diluent to said petroleum residuum as it is charged to said cracking unit, and adding a second portion of the hydrogen donor diluent to said petroleum residuum at a point in said cracking


10,000
1000
100
RESID CONVERSION 60 %
BENZENE + MEK INSOLUBLES 1%
RESID 1000° F + ARABIAN HEAVY
ALL DONOR MIXED WITH RESID CHARGE
RATIO OF THE RATE OF HYDROGEN TRANSFER TO THE RATE OF THERMAL CRACKING UNIFORM THROUGH REACTOR (IDEAL CASE)
HYDROGEN CONSUMPTION, SCF H2 / BBL CRACKED
850
870
890
REACTOR OPERATING TEMPERATURE, °F

unit downstream from the petroleum residuum inlet thereto.

4,002,557
CATALYTIC CONVERSION OF HIGH METALS FEED STOCKS

Hartley Owen, Belle Mead, and Paul B. Venuto, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 473,608, May 28, 1974. This application Mar. 7, 1975, Ser. No. 556,251
Int. Cl.² C10G *11/04;* B01J *8/24*
U.S. Cl. 208—120 **6 Claims**

1. A method for converting residual hydrocarbons comprising greater than 1 ppm of nickel and vanadium as metal contaminants which comprises,

mixing said metal contaminated residual hydrocarbons with at least 25 wt. percent of low molecular weight carbon hydrogen fragment contributing material of less than 5 carbon atoms and contacting the mixture with a crystalline zeolite cracking catalyst of a pore size opening within the range of 4 to 15 Angstroms under conditions providing a contact mix temperature within the range of 800° F. to 1200° F.,

providing a hydrocarbon residence time in contact with said catalyst within the range of 0.5 to 10 seconds and recovering a product of said conversion operation comprising improved yields of isobutane and aromatic gasoline than obtained in the absence of said carbon hydrogen fragment contributor.

4,002,558
REMOVING WATER HAZE FROM DISTILLATE FUELS

Nicholas Feldman, Woodbridge, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Jan. 22, 1976, Ser. No. 651,405
Int. Cl.² C10G *33/04*
U.S. Cl. 208—188 **7 Claims**

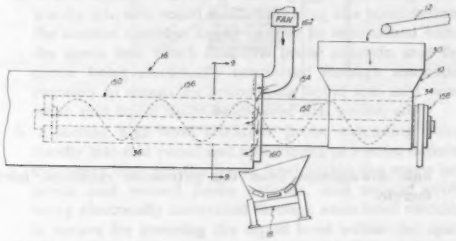
1. A method for removing water haze from a middle distillate fuel which comprises contacting said fuel with from 0.002 to 2 volumes per 100 volumes of said fuel, of a solution of an inorganic halide or nitrate of calcium, magnesium, cadmium, copper or nickel dissolved in a water-miscible, fuel-immiscible aliphatic monohydric alcohol, polyhydric alcohol or glycol ether, said solution containing from 0.1 to 50 wt. % of said inorganic halide or nitrate.

4,002,559

SCREW CONVEYOR WITH DEWATERING MEANS

Malcolm M. Paterson, Atkinson, N.H., and Michael J. Theodore, Weston, Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Aug. 25, 1975, Ser. No. 607,414
Int. Cl.² B03B *1/00*
U.S. Cl. 209—3 **15 Claims**



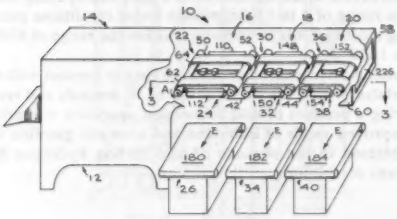
1. Material conveying apparatus comprising an elongated casing, a feed screw for moving material longitudinally within the casing, and dewatering means enclosing at least a portion of said screw for removing water from material being moved by said screw, said dewatering means comprising an apertured dewatering cylinder extending longitudinally within the casing and in close encircling relation to the feed screw, and means for directing a high velocity air flow within the casing and over the outer surface of the cylinder for creating a venturi effect at the apertures in the cylinder to assist in removal of water from the material through the apertures.

4,002,560

AUTOMATIC ARTICLE SORTING APPARATUS

Frederick W. Grantham, 12055 Goshen Ave., Los Angeles, Calif. 90066

Filed July 24, 1975, Ser. No. 598,862
Int. Cl.² B07C *1/10*
U.S. Cl. 209—73 **20 Claims**



1. Apparatus for automatically sorting a plurality of intermixed laundry pieces differing according to a predetermined parameter and segregating them in separate stacks according to at least two different values of said parameter, the apparatus comprising:

a. conveying means adapted for receiving sequentially a quantity of articles to be sorted and for conveying received articles therealong, the conveying means including at least an input conveyor assembly, an output conveyor assembly and a pair of intermediate conveyor assemblies arranged in series;

b. receiving means associated with the conveying means and adapted for receiving sorted articles therefrom, the receiving means including a plurality of receiving assemblies individually associated with corresponding ones of the intermediate assemblies;

c. a plurality of sorting means individually associated with corresponding ones of the intermediate conveyor assemblies for sensing articles being conveyed along the associated intermediate conveyor assemblies according to at least two selected values of a predetermined article parameter and for momentarily stopping the corresponding intermediate conveyor assembly upon sensing said predetermined parameter; and

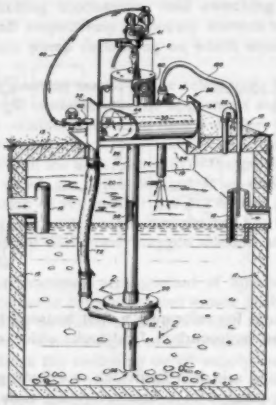
d. discharging means responsive to each sorting means for discharging a positively sorted article from its corresponding intermediate conveyor assembly to a predetermined receiving assembly.

4,002,561

METHOD AND APPARATUS FOR AEROBIC SEWAGE TREATMENT

Charles E. Traverse, Lake Waynewood, Lake Ariel, Pa. 18436

Continuation-in-part of Ser. No. 525,656, Nov. 24, 1974, abandoned. This application Mar. 4, 1976, Ser. No. 663,799
Int. Cl.² B01F *3/04*; C02B *3/08*; C02C *1/08*
U.S. Cl. 210—14 **20 Claims**



1. In a septic tank system for collecting and treating contaminated liquids such as domestic sewage, the improvement which comprises in combination:

means for simultaneously withdrawing a portion of the contaminated liquid from said tank and reducing the size of floc particles contained therein;

means for introducing the contaminated liquid into an elongated generally cylindrical treatment vessel, said vessel containing a tangential inlet on one end and a tangential outlet on the other end to cause the liquid to circulate around the circumference of said vessel and along its axis, thus creating hydraulic turbulence in said fluid;

said vessel having therein surface means to contact and reduce said floc particles in size by mechanical shear forces; and

means to introduce an oxygen-containing gas into said liquid in said vessel; whereby said floc particles are subjected to optimum size reduction and optimum transfer of oxygen to maximize aerobic treatment of the contaminated liquid.

17. A method of treating a contaminated liquid such as domestic sewage normally discharged into a septic tank comprising the steps of:

continuously withdrawing a portion of the contaminated liquid from the septic tank;

injecting the withdrawn liquid into a closed treating vessel having therein surface means to contact floc particles contained in the liquid;

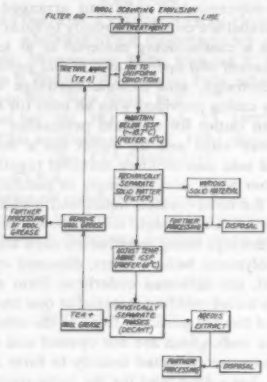
causing said liquid to flow tangentially through said vessel under conditions of hydraulic turbulence so that said floc particles are subjected to shear forces by moving across said contacting means in said vessel; and

simultaneously injecting an oxygen-containing gas into said vessel; whereby said portion of the contaminated liquid in said vessel is given a maximum aerobic treatment of micro-liquefaction of the floc particles in the contaminated liquid and returning said treated portion of said contaminated liquid to said septic tank.

4,002,562
OIL EMULSION PROCESSING

Robert K. Ames, Seattle, and Hans H. Peters, Federal Way, both of Wash., assignors to Resources Conservation Co., Renton, Wash.

Filed Sept. 18, 1975, Ser. No. 614,511
Int. Cl.² B01D 17/04
U.S. Cl. 210—22 R 11 Claims



1. A method of breaking oil-water emulsions and recovering the oil component thereof without acidification comprising forming a mixture of the emulsion with a liquid amine having the formula:

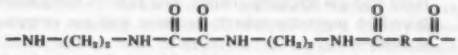
wherein R_1 is hydrogen or alkyl, R_2 and R_3 are alkyl of 1 to 6 carbon atoms or alkenyl of 2 to 6 carbon atoms, the total number of carbon atoms in the molecule being in the range of 3 to 7 inclusive, in which the oil of the emulsion is soluble and which has an inverse critical solution point in a two phase system with water, at a temperature below the phase separation temperature of the amine and water so as to form a single liquid phase of amine, oil and water, the amount of amine being sufficient that substantially complete miscibility with the emulsion occurs below the said inverse critical solution temperature, then raising the temperature of the said single liquid phase above the critical solution temperature to effect liquid phase separation whereby an amine phase containing substantially all of the oily material of the emulsion and a water phase containing substantially no oily material are formed, separating the two liquid phases and separately recovering the oily material and amine from the amine phase.

4,002,563
REGULAR COPOLYAMIDES AS DESALINATION MEMBRANES

Otto F. Vogl, Amherst, Mass., and Donald R. Stevenson, Brunswick, Ohio, assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Division of Ser. No. 471,513, May 20, 1974, Pat. No. 3,935,172. This application May 23, 1975, Ser. No. 580,444
Int. Cl.² B01D 13/00
U.S. Cl. 210—23 H 4 Claims

1. In a process for desalination of saline water by reverse osmosis comprising contacting the saline water under pressure with a reverse osmosis membrane, the improvement comprising using as the reverse osmosis membrane a membrane comprising a film of a regular copolyamide consisting essentially of the repeating units:



where R is selected from the group consisting of the isophthaloyl radical, the sebacyl radical and the pyridyl radical.

4,002,564
CATION-EXCHANGE RESINS HAVING CROSS-LINKED VINYL AROMATIC POLYMER MATRIX WITH ATTACHED AMINO ALKYLENE PHOSPHONIC ACID GROUPS, THEIR USE, AND PREPARATION

Jack Carbonel; Paul D. A. Grammont, and Jean E. E. Herbin, all of Chauny, France, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

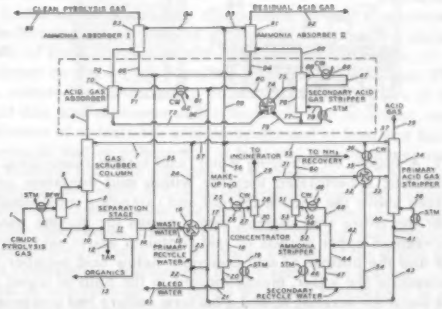
Filed July 23, 1975, Ser. No. 598,526
Claims priority, application France, July 24, 1974, 74.25610
Int. Cl.² C08F 212/08, 8/40; C22B 3/00
U.S. Cl. 210—38 R 5 Claims

1. A cation-exchange resin having a cross-linked vinyl aromatic polymer matrix and characterized, in the acid form, by active groups attached to the aromatic rings of the formula: $-CH_2NHRPO(OH)_2$, wherein R is C_1–C_3 lower alkylene.

4,002,565
WASTE-WATER PROCESS

Thomas R. Farrell, El Sobrante; Robert J. Klett, San Francisco, and James A. Craig, San Rafael, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Aug. 25, 1975, Ser. No. 607,309
Int. Cl.² B01D 3/06
U.S. Cl. 210—60 8 Claims



1. A process for separating acid gas and ammonia from waste water having an appreciable content thereof and for the production of recycle water, comprising the steps:

1. producing a first recycle water stream and an effluent gas stream comprising acid gas, ammonia and water vapor by passing said waste water into an acid gas-ammonia stripping column, said column being maintained at a bottoms temperature in the range from about 93° to 149° C and at a pressure in the range from about 1 to 5 atmospheres absolute, said first stream having an acid gas and ammonia content which is less than 15 percent of the content thereof for said waste water;
2. separately withdrawing said first recycle water stream and said effluent gas stream from said acid-gas ammonia stripping column;
3. Producing a liquid aqueous concentrate of ammonia and acid gas by decreasing the temperature of said effluent gas stream, said temperature decrease being an amount in the range from about 55° to 110° C.
4. producing an effluent acid-gas stream and an aqueous bottoms stream by passing said concentrate into a primary acid-gas stripping column, said column being maintained at superatmospheric pressure acid-gas stripping conditions;
5. separately withdrawing said acid-gas stream and said bottoms stream from said acid-gas stripping column; and
6. producing an effluent gas stream comprising ammonia and a second recycle water stream by passing said bottoms stream into an ammonia stripping column, said column being maintained at superatmospheric pressure ammonia stripping conditions, said second stream having an acid gas and ammonia content which is less than 15 percent of the content thereof for said bottoms stream from said acid-gas stripping column.

4,002,566

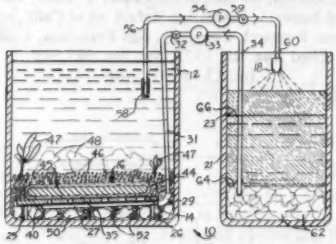
WATER PURIFYING SYSTEMS

John D. Smith, 5748 King Drive, Chicago, Ill. 60637

Filed Apr. 7, 1975, Ser. No. 566,004

Int. Cl.² E04H *3/20*

U.S. Cl. 210—169 **10 Claims**



1. A system for purifying water, said system comprising: a container; a perforated member within said container and spaced above the bottom thereof and extending substantially over the entire area thereof, pump means for moving water between an upper portion of said container above said member and the bottom of said container below said member to recirculate the water, means located in the path of travel of the water for acrating it; and a bacteria culture bed composed of approximately two parts sphagnum moss and approximately three and one-half parts of a mixture of gravel, diatomaceous powder, clay and bone meal; said bed being disposed above and supported by said member.

4,002,567

ULTRAFILTRATION APPARATUS

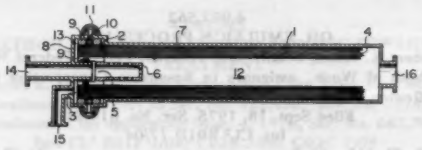
Tsugio Konno; Kohichi Matsumoto, both of Fuji; Shinichi Ohkubo, Tokyo; Yasuo Hashino, Fuji; Kaoru Maeda, Yokohama, and Gilchi Sayanagi, Kurashiki, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 25, 1975, Ser. No. 561,913

Claims priority, application Japan, Mar. 28, 1974, 49-33988

Int. Cl.² B01D *31/00*

U.S. Cl. 210—333 R **1 Claim**



1. An ultrafiltration apparatus comprising
1. a module in which a number of polymeric hollow fibers having semipermeable walls and arranged in approximately parallel are collected orderly to form a bundle and fixed with a cast-molding material at at least one end portion thereof and opened at said end portion to form a module cartridge, said module cartridge is accommodated in a casing provided with an inlet for a liquid to be treated, an outlet for a liquid permeated through said hollow fiber walls and an outlet for a non-permeated liquid and said cast-molding material together with said hollow fiber walls work sealingly as partition between a chamber for to-be-treated liquid and a chamber for the liquid permeated through said hollow fiber walls, said module cartridge being constructed such that great numbers of polymeric hollow fibers, disposed approximately in parallel, are collected orderly to form a bundle and fixed with a cast-molding material at one end and opened at this end but not mutually fixed at the other end resulting in free ends which are not opened and said end part where fibers are collected orderly to form a bundle and are fixed, has a feed inlet for the to-be-treated feed situated at the central part of the bundle of hollow fibers and protruding towards the other end of the hollow fibers,
2. back washing means having a storage tank of permeated liquid for sending said permeated liquid to said module and
3. control means for controlling said module and said back washing means.

4,002,568

LUBRICATING OIL COMPOSITIONS

Gerald John Joseph Jayne, and Herbert Frank Askew, both of Wokingham, England, assignors to Edwin Cooper & Company Limited, Bracknell, England

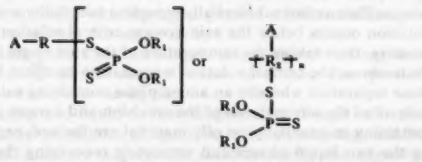
Filed Oct. 3, 1974, Ser. No. 511,920

Claims priority, application United Kingdom, Oct. 4, 1973, 46372/73

Int. Cl.² C10M *1/48*, *3/42*

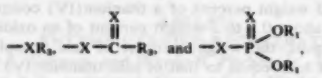
U.S. Cl. 252—46.7 **7 Claims**

1. A lubricating composition consisting essentially of a lubricating oil and a minor effective amount of a compound of the formula



(I) (II)

wherein in Formula (I) R is the residue of an intra-molecular sulphur bridged hydrocarbon ring containing 12 carbon atoms or wherein in Formula (II) $[R_2]_n$ is a polymer comprising the residue of a plurality of substantially intermolecularly sulphur-bridged hydrocarbon rings each containing 12 carbon atoms, n being the degree of polymerisation; each R_1 being independently selected from the group consisting of alkyl, alkenyl, aryl, alkaryl and aralkyl groups and each R_1 containing from 2 to 18 carbon atoms; and A is a nucleophilic group selected from the group consisting of -CN,-NCO,-NCS,



wherein each R_1 is as above, X is oxygen or sulphur and R_3 is an alkyl group containing 1–12 carbon atoms or a phenyl group.

4,002,569

LUBRICATING OIL COMPOSITION CONTAINING AMINOESTER DISPERSANT

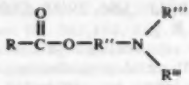
Isaac D. Rubin, Wappingers Falls; Richard F. Love, Fishkill, and Charles B. Holder, Wappingers Falls, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Division of Ser. No. 382,102, July 23, 1973, Pat. No. 3,890,357. This application Dec. 2, 1974, Ser. No. 528,971

Int. Cl.² C10M *1/32*

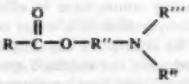
U.S. Cl. 252—51.5 A **14 Claims**

1. A lubricating oil composition comprising a major portion of a petroleum base lubricating oil of lubricating viscosity and admixed therewith a dispersing amount of an aminoester



wherein R, R‴, and R⁗ are saturated hydrocarbon, and R″ is divalent saturated hydrocarbon, said aminoester having been prepared by reacting an alpha nitroketone with a tertiary amino alcohol in mole ratio, of tertiary amino alcohol to nitroketone, of 1–100:1.

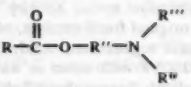
5. A concentrate containing in inert diluent-solvent an aminoester



wherein R, R‴, and R⁗ are saturated hydrocarbon and R″ is divalent saturated hydrocarbon, said aminoester having been prepared by reacting an alpha nitroketone with a tertiary amino alcohol in mole ratio, of tertiary amino alcohol to nitroketone of 1–100:1.

8. The method of improving the dispersancy of a petroleum base lubricating oil of lubricating viscosity which comprises

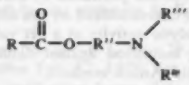
adding to said oil a dispersing amount of 0.1–10 parts per 100 parts of lubricating oil of an aminoester



wherein R‴ and R⁗ are saturated hydrocarbon, R″ is divalent saturated hydrocarbon, and R is a polymer-derived moiety having a hydrocarbyl backbone, said aminoester having been prepared by reacting an alpha nitroketone with a tertiary amino alcohol in mole ratio, of tertiary amino alcohol to nitroketone, of 1–100:1.

10. The method of improving the viscosity index of a petroleum base lubricating oil of lubricating viscosity which comprises

adding to said oil a viscosity-index improving amount of 0.5–3 parts per 100 parts of said oil of an aminoester



wherein R‴ and R⁗ are saturated hydrocarbon, R″ is saturated hydrocarbon, and R is a polymer-derived moiety having a hydrocarbyl backbone, said aminoester having been prepared by reacting an alpha nitroketone with a tertiary amino alcohol in mole ratio, of tertiary amino alcohol to nitroketone, of 1–100:1.

4,002,570

ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLIDENE FLUORIDE ADDITIVE

Nero R. Lindblad, Palmyra, and James M. Pearson, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 26, 1973, Ser. No. 428,540

Int. Cl.² G03G *9/02*

U.S. Cl. 252—62.1 P **5 Claims**

1. In a developer composition for use in automatic electrophotographic machines, said composition comprising a particulate free-flowing carrier vehicle, an electroscopic toner material and a particulate polyvinylidene fluoride lubricant having an average particle size less than that of the toner material, the improvement comprising:

said particulate polyvinylidene fluoride being cross-linked by high energy ionizing irradiation in the range of about 0.7 to 10 megarads, whereby the dimensional stability of said particulate lubricant is upgraded.

4,002,571

CLEANING COMPOSITIONS

Robert C. Anderle, and Robert F. Schwarz, both of Racine, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Continuation-in-part of Ser. No. 232,940, March 8, 1972, abandoned. This application Oct. 1, 1974, Ser. No. 510,871

Int. Cl.² A47L *7/02, 11/32;* C11D *7/10, 7/26*

U.S. Cl. 252—90 **24 Claims**

1. An aqueous cleaning composition having a minimum film-forming temperature of at least 30° C. consisting essentially of from about 1 to about 50 percent, by weight, of a polymer having a glass transition temperature of at least 35° C., selected from the group consisting of co-polymers of at least one acid monomer and at least one soft monomer, co-polymers of at least one acid monomer and at least one hard monomer, and co-polymers of at least one acid monomer and a mixture of hard and soft monomers, from about 0.1 to about 5 percent, by weight, of a metal salt selected from salts of zinc, cadmium, copper, nickel, cobalt, zirconium, chromium, magnesium, manganese, calcium or mixtures thereof, said composition forming a tacky film which, as a result of the drying of said composition, fractures to form a removable residue.

14. A composition as defined by claim 1 packaged in a pressurized aerosol package, said composition including an effective amount of a propellant to dispense said composition, said propellant selected from the group consisting of normally gaseous hydrocarbons, liquified halogenated hydrocarbons and inert compressible gases.

4,002,572

ALKALINE PROTEASE PRODUCED BY A BACILLUS

Bauke te Nijenhuis, Rijswijk-ZH, Netherlands, assignor to Gist-Brocades N.V., Delft, Netherlands

Filed Nov. 18, 1975, Ser. No. 633,026

Claims priority, application United Kingdom, Nov. 19, 1974, 50044/74

Int. Cl.[2] C12D *13/10*; C11D *7/42*

U.S. Cl. 252—99 7 Claims

4. An alkaline protease produced by cultivation of Bacillus nov. sp. PB 92 and characterized by the following properties:

a optimal proteolytic activity at a pH value above 12, said activity being measured against denatured hemoglobin according to the Anson method,

b. consisting of at least three proteolytically active components showing a characteristic zymogram following disc electrophoresis as shown in the accompanying figure,

c) the two main components having the following amino acid composition:

	component 1	component 2
Lysine		
Histidine	7	6
Arginine	9	8
Asparctic acid	27	28
Threonine	16	16
Serine	30	30
Glutamic acid	15	15
Proline	12	13
Glycine	31	33
Alanine	36	36
Cystine	0	0
Valine	22	22
Methionine	3	3
Isoleucine	8	9
Leucine	18	18
Tyrosine	7	6
Phenylalanine	2	2
Tryptophan	3	3

d) the two main components having the following physical properties

isolectric point	10.5	10.5
molecular weight	25,500	25,500

e. showing an improved washing action in perborate containing washing compositions.

5. A washing composition containing an effective amount of the enzyme of claim 4 having a high proteolytic activity in alkaline media.

4,002,573

AZEOTROPES OF 1,2-DICHLORO-1,1,2-TRIFLUOROETHANE

William Milton Hutchinson, deceased, late of Claremore, Okla. (by Florence M. Hutchinson, executrix), assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 396,814, Sept. 13, 1973, Pat. No. 3,940,342. This application Sept. 5, 1975, Ser. No. 610,812

Int. Cl.[2] C11D *7/50*

U.S. Cl. 252—171 7 Claims

1. A substantially constant boiling admixture of (A) 1,2-dichloro-1,1,2-trifluoroethane and (B) diethyl ether which at substantially atmospheric pressure is characterized as about 58 to 60 weight percent (A) and about 42 to 40 weight percent (B).

4,002,574

PHOTOSENSITIVE REDOX SOLUTIONS

Robert C. Wade, Ipswich, Mass., assignor to Ventron Corporation, Beverly, Mass.

Division of Ser. No. 196,804, Nov. 8, 1971, which is a continuation-in-part of Ser. No. 842,716, July 12, 1969, abandoned. This application Feb. 24, 1975, Ser. No. 552,365

Int. Cl.[2] B01J *27/10*, *31/38*, *1/10*

U.S. Cl. 252—188 6 Claims

1. An aqueous photosensitive redox solution having a pH between about 2 and about 10 comprising essentially (1) from about 0.1 to 3 weight percent of a titanium(IV) compound and (2) from about 0.5 to 3 weight percent of an oxidizable complexing agent, the weight percent of said complexing agent being at least equal to that of said titanium(IV) compound, said titanium(IV) compound being selected from the group consisting of (a) the reaction product of substantially anhydrous trimethyl borate with substantially anhydrous titanium tetrachloride, (b) a water soluble titanium compound conforming substantially to the formula $Cl_2Ti(OR)_2$ where R is selected from the group consisting of H, CH_3, C_2H_5, C_3H_7 and C_4H_9, (c) titanyl sulfate solutions and (d) titanyl chloride solutions, said oxidizable complexing agent being selected from the group consisting of N-hydroxyethylene-diaminetriacetic acid, diethanol glycine, glucoheptanoic acid, saccharic acid, mucic acid, the sodium and ammonium salts of these acids, polyvinyl alcohol and mixtures thereof.

4,002,575

REJUVENATION OF SUPPORTED GROUP VIII METAL CATALYSTS

John W. Ward, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Aug. 14, 1975, Ser. No. 604,818

Int. Cl.[2] B01J *23/96*, *29/38*; C10G *13/02*

U.S. Cl. 252—411 R 11 Claims

1. A method for rejuvenating a catalyst comprising a non-zeolitic Group VIII metal supported on a siliceous zeolite base, said catalyst having been subjected to thermal and/or hydrothermal conditions resulting in a maldistribution of said Group VIII metal on said zeolite base with resultant reduction in hydrogenation activity, which comprises:

A. contacting said catalyst in an oxidized or sulfided state and at a temperature below about 300° F with water or water vapor and with ammonia to adsorb therein about 5–40 weight-percent of water containing at least about 5 weight-percent of dissolved ammonia;

B. drying and calcining the hydrated-ammoniated catalyst in a non-reducing atmosphere to effect deammoniation thereof, and dehydration to a water content of less than about 25% of its adsorptive capacity for water;

C. partially rehydrating the calcined catalyst at a temperature below about 300° F to an extent of not more than about 80% and not less than about 10% of its adsorptive capacity for water; and

D. activating the rehydrated catalyst for about 2–40 hours in a stream of essentially dry hydrogen at temperatures gradually increasing to a level between about 600° and 800° F.

6. A method for rejuvenating a catalyst comprising a non-zeolitic Group VIII metal supported on a siliceous zeolite base, said catalyst having previously been utilized at elevated temperatures in a hydrocarbon conversion process to substantial deactivation, and having been subsequently regenerated by oxidative combustion to an activity level substantially below that of the original fresh catalyst, which comprises:

A. contacting said regenerated catalyst at a temperature below about 300° F with water or water vapor and with ammonia to adsorb therein about 5–40 weight-percent of water containing at least about 5 weight-percent of dissolved ammonia;

B. drying and calcining the hydrated-ammoniated catalyst in a non-reducing atmosphere to effect deammoniation

thereof, and dehydration to a water content of less than about 25% of its adsorptive capacity for water;

C. partially rehydrating the calcined catalyst at a temperature below about 300° F to an extent of not more than about 80% and not less than about 10% of its adsorptive capacity for water; and

D. activating the rehydrated catalyst for about 2–40 hours in a stream of essentially dry hydrogen at temperatures gradually increasing to a level between about 600° and 800° F.

4,002,576
ENZYME CARRIER REGENERATION

Jerry L. Gregory, and Wayne H. Pitcher, Jr., both of Painted Post, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed July 18, 1975, Ser. No. 597,012
Int. Cl.² B01D *15/06;* **C12B** *1/00;* **C12K** *1/00*
U.S. Cl. 252—415 **6 Claims**

1. A method of regenerating a spent immobilized glucose isomerase composite comprising glucose isomerase adsorbed to porous particles of a $MgO\text{-}Al_2O_3$ carrier and having associated therewith carbonaceous material and contaminants resulting from use of the composite for the continuous isomerization of glucose to fructose, the method comprising the step of fluidizing the spent composite particles in a fluidized bed reactor by circulating a sodium hypochlorite solution through the composite under conditions sufficient to remove substantially all carbonaceous material and contaminants.

4,002,577
COPPER CARBONYL-CONTAINING CATALYTIC SOLUTIONS

Takashi Koyano, Tokyo; Yoshihisa Matsushima, Ohi, and Tetsuo Kitamura, Kawasaki, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 385,156, Aug. 2, 1973, abandoned. This application Aug. 28, 1975, Ser. No. 609,538
Claims priority, application Japan, Aug. 7, 1972, 47-78401; Jan. 29, 1973, 48-11144; Feb. 27, 1973, 48-22691
Int. Cl.² B01J *27/12*
U.S. Cl. 252—433 **7 Claims**

1. A catalyst composition useful for the treatment of olefins or alcohols with carbon monoxide in the preparation of carboxylic acids which consists essentially of a solution of hydrated boron trifluoride having a ratio of not more than 3 moles of water per mole of boron trifluoride and a minor amount of copper (I) carbonyl.

4,002,578
CATALYST ACTIVATION PROCESS

Sigmund M. Csicsery, Lafayette, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed June 27, 1975, Ser. No. 591,089
Int. Cl.² B01J *29/06*
U.S. Cl. 252—455 Z **18 Claims**

1. A method of increasing the acid catalytic activity of a crystalline zeolitic aluminosilicate having at least 6-Angstrom-sized pores, containing at least one kind of alkaline earth cations, in an amount providing at least about 50% of the cationic requirement thereof, and having less than 1% of its cationic requirement furnished by hydrogen cations, which comprises a sequence of steps, including:

1. subjecting said aluminosilicate while at a temperature in the range 700° to 920° C to a reducing atmosphere comprising hydrogen gas; and
2. subjecting said aluminosilicate while at a temperature above about 315° C to an oxidizing atmosphere comprising molecular oxygen gas,

said subjectings each being for a period in the range from about 0.15 to 10 hours and said temperatures being below the temperature at which a substantial portion of the crystallinity of said aluminosilicate is destroyed.

16. A method as in claim 1 further characterized in that said cationic requirement includes ions of hydrogenation component metals selected from Groups, IV, VI and VIII, said ion having been base exchanged into said zeolite.

4,002,579
DETERGENT COMPOSITION

Hiroshi Mizutani, Yachiyo; Fumikatsu Tokiwa; Tetsuya Imamura, both of Wakayama, and Toshiro Sakurada, Funabashi, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 267,195, June 28, 1972, abandoned. This application Feb. 12, 1975, Ser. No. 549,323
Claims priority, application Japan, July 1, 1971, 46-48287
Int. Cl.² C11D *3/26*
U.S. Cl. 252—544 **3 Claims**

1. A detergent composition consisting essentially of

A. from 5 to 50 parts by weight of surfactant component consisting essentially of

1. from 5 – 95% by weight of water-soluble polyoxyethylene sorbitan monoester of fatty acid having 8 to 22 carbon atoms and containing from 5 to 50 oxyethylene units in the molecule,
2. the balance being fatty acid alkylolamide selected from the group consisting of diethanolamides and polyoxyethylene monoethanolamides having 10 to 20 oxyethylene units in the molecule, of fatty acids having 8 to 22 carbon atoms, and

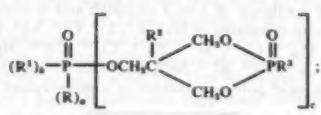
B. from 1 to 50 parts by weight of an organic acid salt having a chelating ability selected from the group consisting of the alkali metal and ammonium salts of gluconic acid, citric acid, malic acid, tartaric acid, and lactic acid.

4,002,580
FIRE-RETARDANT POLYURETHANE

Robert Victor Russo, Brooklyn, N.Y., assignor to GAF Corporation, Wayne, N.J.

Filed Sept. 12, 1974, Ser. No. 505,359
Int. Cl.² C08G *18/14, 18/30, 18/38;* **C08K** *5/53*
U.S. Cl. 260—2.5 AJ **23 Claims**

10. A polyurethane produced by reaction of an unhalogenated polyether polyol, an organic polyisocyanate, 2,3-dibromo-2-butenediol-1,4, and a phosphourus-containing compound selected from the formulea:



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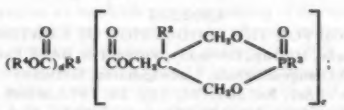

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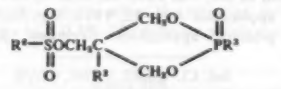

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and mixtures thereof; wherein each of *a* and *b* has a value of 0 to 2 inclusive; *c* is an integer of from 1 to 3 and the sum of *a*, *b*, and *c* is 3; each of R and R^1 is an alkyl, alkoxy, aryloxy, alkaryl, alkaryloxy, aralkyl, arloxyalkoxy, or aralkoxy radical wherein each of said alkyl moieties is unsubstituted or hydroxy-substituted; and each of any aryl portion of said radical is an unsubstituted, or hydroxy- or chlorine-substituted aromatic hydrocarbon; R^2 is an alkyl, hydroxyalkyl, or unsubstituted aromatic hydrocarbon radical; R^3 is an alkyl or hydroxy-

alkyl radical; *d* has a value of from 0 to 2 inclusive; *e* is an integer of from 1 to 3 inclusive; and the sum of *d* and *e* is not in excess of 3; R^4 is an alkyl, aryl, alkaryl, aralkyl or aryloxyalkyl group, wherein any aryl portion of said group is an unsubstituted, or chlorine- or hydroxy-substituted aromatic hydrocarbon; R^5 is an alkyl, alkylene, aryl or arylene radical; and each of said aryl and arylene radicals is an unsubstituted or chlorine- or hydroxy-substituted aromatic hydrocarbon moiety; and R^6 is an alkyl, aryl, alkaryl, aralkyl or aryloxyalkyl group wherein any aryl moiety present is an unsubstituted, hydroxy-substituted or chlorine-substituted aromatic hydrocarbon moiety; and wherein said 2,3-dibromo-2-butenediol-1,4 and said phosphorus-containing compound are present in an amount sufficient to provide by weight percent of the final product a sum total of bromine (Br) and phosphorus (P), defined by the equation: $P + Br/10 \cong 0.1$ to 1.0 and wherein phosphorus (P) has a value of not less than 0.05 weight percent and bromine (Br) has a value of not less than 0.5 weight percent.

18. A polyurethane as claimed in claim **10** wherein said polyurethane is a cured, flexible, stable polyester or polyether urethane foam.

4,002,581

FOAMED THERMOPLASTIC COMPOSITIONS OF A LINEAR POLYESTER AND AN IONICALLY CROSSLINKED COPOLYMER

Thomas Joseph Dolce, Stirling, N.J., assignor to General Electric Company, Pittsfield, Mass.

Filed Dec. 8, 1975, Ser. No. 638,807

Int. Cl.² C08J *9/06*

U.S. Cl. 260—2.5 N **16 Claims**

1. A foamed thermoplastic composition which comprises:

a. a linear polyester resin;

b. a minor amount of polytetrafluoroethylene resin; and

c. a minor amount of a copolymer selected from the class consisting of polymers of α-olefins having the general formula $RCH = CH_2$ where R is a radical selected from the class consisting of hydrogen and alkyl radicals having from 1 to 8 carbon atoms, the olefin content of said polymer being at least 50 mole percent, based on the polymer, and an α,β-ethylenically unsaturated mono- or dicarboxylic acid, the acid monomer content of said polymer being from 0.2 to 25 mole percent, based on the polymer, said mono carboxylic acid polymer containing uniformly distributed throughout the polymer a metal ion having a valence of 1 to 3 inclusive and is selected from the group consisting of Na^+, K^+, Li^+, Cs^+, Ag^+, Hg^+, Cu^+, Be^{+2}, Mg^{+2}, Ca^{+2}, Sr^{+2}, Ba^{+2}, Cu^{+2}, Cd^{+2}, Hg^{+2}, Sn^{+2}, Pb^{+2}, Ca^{+2}, Ni^{+2}, Al^{+3}, Sc^{+3}, Fe^{+3} and Y^{+3} and said dicarboxylic acid polymer containing a monovalent such ion.

4,002,582

METHOD FOR THE PRODUCTION OF COATINGS

Peter Fritsche, Hiltrup, Germany, assignor to BASF Farben & Fasern Aktiengesellschaft, Ludwigshafen, Germany

Division of Ser. No. 389,794, Aug. 20, 1973, which is a continuation of Ser. No. 149,792, June 3, 1971, abandoned. This application Aug. 22, 1974, Ser. No. 499,609

Claims priority, application Germany, June 4, 1970, 2027428

Int. Cl.² C08L *91/00, 61/10*

U.S. Cl. 260—4 R **4 Claims**

1. An aqueous coating composition for the production of electrodepositable coatings followed by air drying or baking at a temperature below 85° C consisting of an aqueous dispersion of a water-insoluble synthetic resin in a mixture dissolved or dispersed in water partly in the form of a salt with ammonia or a water-soluble organic amine, said mixture consisting essentially of:

I. about 10 to 50 percent by weight of a non-heat reactive phenolic aldehyde resin; and

II. about 50 to 90 percent by weight of a copolymer of:

A. about 50 to 85 percent by weight of an ester of acrylic or methacrylic acid with an alcohol having one to 10 carbon atoms;

B. about 5 to 20 percent by weight of at least one oil containing at least one olefinically unsaturated fatty acid;

C. about 5 to 15 percent by weight of a copolymerizable α,β-olefinically unsaturated carboxylic acid having 3 to 5 carbon atoms; and

D. about 3 to 20 percent by weight of at least one compound selected from the group consisting of acrylamide, methacrylamide, methylolacrylamide and methylolmethacrylamide and ethers of methyllolacrylamide and methylolmethacrylamide with alcohols having 1 to 8 carbon atoms; wherein

the sum of the percentages given under A to D being 100 percent, the improvement comprising said water-insoluble synthetic resin being cyclized rubber and dispersed in the aqueous solution or dispersion of said mixture from I and II, the dispersion being made by dispersing a solution of cyclized rubber in organic solvents in the aqueous solution or dispersion of said mixture from I and II, the ratio of weight between cyclized rubber and the sum of I and II being from about 40–70 percent cyclized rubber to about 0–30 percent of the sum of I and II, said cyclized rubber having a specific gravity of about 0.97–1.02, a melting point of about 135°–150° C and a viscosity of about 700–1050 seconds running time as measured in a viscosimeter at 50 percent solution of analytical benzene according to German Industrial Standard 53,211.

4,002,583

SUBSTRATE COATING COMPOSITION

Lynn J. Taylor, Toledo, Ohio, and John D. Grier, Harlysville, Pa., assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 316,124, Dec. 18, 1972, Pat. No. 3,877,962. This application Feb. 3, 1975, Ser. No. 546,357

Int. Cl.² C08L *1/28*

U.S. Cl. 260—17 R **5 Claims**

1. As a composition of matter, a coating system to be applied to a substrate, the system consisting of at least one particulate, solid, inorgainc substance dispersed in at least one thermally thinnable fugitive vehicle, said fugitive vehicle being a low-molecular-weight liquid polymer selected from the group consisting of polyethers, poly(alkyl methacrylates), methacrylate copolymers, polycarbonates, polyesters, polyisobutylene, polystyrene, poly(alkyl vinyl ethers), styrene/alphamethylstyrene copolymers, vinyl toluene/alphamethylstyrene copolymers, and olefin-sulfur dioxide copolymers, the vehicle being non-drying and sufficiently viscous at the temperature of the substrate application to prevent settling of said dispersed particulate solid substance and convertible to a sufficiently low viscosity liquid on heating to a higher temperature to permit controlled settling of and improved densification of said particulate solid substance and thermally removable on heating to a still higher temperature leaving said particulate solid substance.

4,002,584

PROCESS FOR THE PRODUCTION OF URETHANE ELASTOMERS

Akio Takahashi, Yokohama; Hirokichi Saito, Shimizu, and Yoshijiro Oyaizu, Yaizu, all of Japan, assignors to Ihara Chemical Kogyo Kabushiki Kaisha, Tokyo, Japan

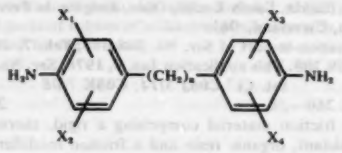
Filed Aug. 5, 1974, Ser. No. 495,097

Claims priority, application Japan, Aug. 6, 1973, 48-88235

Int. Cl.² C08G *18/18, 18/32*

U.S. Cl. 260—18 TN **6 Claims**

1. A one-shot process for the production of solid urethane elastomers, characterized by reacting simultaneously a water-free mixture consisting essentially of a long-chain polyol having a molecular weight of 400–5000, an organic diisocyanate and at least one halogenated aromatic diamine



selected from the group consisting of 3,3',5,5'-tetrachlorobenzidine, 2,2',5,5'-tetrachlorobenzidine, 4,4'-methylene-bis(2,5-dichloroaniline) 4,4'-methylene-bis(2,3-dichloroaniline), and 4,4'-methylene-bis(2,6-dichloroaniline), said diamine being preliminarily dissolved in said polyol without reacting the same and said diisocyanate and then being added to the resultant mixture to effect said simultaneous reaction.

4,002,585

PRINTING INK BINDER RESIN

Toshio Oishi, Nishinomiya; Satoru Yoshimoto, Higashiosaka, and Hiroshi Sasaki, Nara, all of Japan, assignors to Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 7, 1975, Ser. No. 630,030
Claims priority, application Japan, Nov. 8, 1974, 49-129430
Int. Cl.² C08L *91/00*
U.S. Cl. 260—25 15 Claims

1. A printing ink binder resin comprising a reaction product of (a) a rosin, (b) 5 to 300 parts of an α,β-ethylenically unsaturated carboxylic acid-modified petroleum resin having an acid value of 10 to 60, a bromine value of 20 to 50 and a softening point of 85° to 170° C., (c) 20 to 80 parts of a resol-type phenol-formaldehyde pre-condensate, and (d) a polyhydric alcohol, said reaction product having an acid value of not more than 30, a softening point of not less than 140° C., a viscosity of a 33% by weight linseed oil solution of not less than Y by a Gardner-Holdt bubble viscometer at 25° C. and a tolerance of not less than 5, said (d) being present in an amount of 0.6 to 1.2 equivalents of —OH group per equivalent of —COOH group in both said (a) and (b), and said parts of (b) and (c) being parts by weight per 100 parts of (a).

4,002,586

METHOD FOR PREPARING CATIONIC LATEXES

Ritchie A. Wessling; Thomas C. Klingler, and Victor E. Meyer, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 21, 1975, Ser. No. 569,720
Int. Cl.² C08L *63/00*
U.S. Cl. 260—29.2 EP 10 Claims

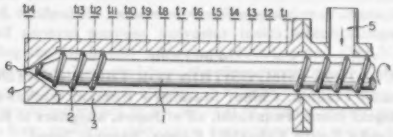
1. A method for preparing a cationic structured-paticle latex comprising the steps of reacting at a temperature from about 0° to about 80° C a water-stable, nonionic, sulfide nucleophile which is capable of diffusing through aqueous media and a low molecular weight acid which ionizes at pH values below about 10 with a latex of copolymer particles having epoxide groups bound to the copolymer at or near the particle surface; said epoxide groups being present in an amount of at least about 0.01 milliequivalent per gram of copolymer in the latex; whereby sulfonium cationic groups are chemically bound to the particles at or near the particle surface.

4,002,587

PROCESS FOR PRODUCING GRANULAR ACTIVATED CARBON

Yasuo Watanabe, Sanjo, and Toshiyuki Miyajima, Tokyo, both of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed May 30, 1975, Ser. No. 582,244
Claims priority, application Japan, Feb. 7, 1975, 50-15282
Int. Cl.² C01B *31/08*
U.S. Cl. 264—29.4 8 Claims



1. A process for producing granular activated carbon from scrap tire pyrolysis residue which comprises homogeneously kneading at an elevated temperature a mixture of (A) (1) the scrap tire pyrolysis residue and (A) (2) a wooden carbonaceous material with (B) a carbonaceous binder, the ratio (A) (1) / (A) (2) being from 100/30 to 100/300 and the ratio of (A) / (B) being from 50/50 to 65/35, extruding the kneaded mixture from a cylindrical screw extruder having a temperature in the range from 60° to 200° C at the inlet cylinder surface and a temperature in the range of from 140° to 250° C at the outlet, cutting the extruded composition to a selected length, and carbonizing and then activating the cut extrusion product.

4,002,588

HYDROPHILIC-HYDROPHOBIC AMPHOTERIC POLYSALT SIZING COMPOSITONS AND PAPER SIZED THEREWITH

Edward Strazdins, Fairfield, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed May 8, 1974, Ser. No. 468,113
Int. Cl.² C08L *39/04*, *63/00*, *77/00*
U.S. Cl. 260—29.6 NR 9 Claims

1. A polysalt of (A) a normally water-insoluble but water-dispersible anionic vinyl polymer consisting essentially of 65 to 94 mol percent of acrylamide units, 5 to 15 mol percent of styrene units, and 1 to 20 mol percent of acrylic acid units; and (B) a cationic water-soluble polyamine having a molecular weight in excess of 1,000, the ratio of the number of anionic substituents in said anionic polymer to the number of cationic substituents in said polyamine being between about 50/50 and 90/10 such when 1%–10% by weight of an aqueous solution of a polysalt-ionization suppressor complex is added to water having a pH in the range of 4 to 7, said polysalt separates as an insoluble phase consisting of discrete colloidal particles which are neutral or ionic, wherein said polysalt-ionization complex is prepared by mixing 10%–20%, by weight, aqueous solutions of (A) and (B) so as to form a supernatant layer, adding a strong water-soluble acid with a pH of less than about 3 to the mixture, such that the supernatant layer dissolves and remains soluble when the resulting solution is diluted with water to a 0.5%–1% polymer solids content.

4,002,589

PREPARATION OF WATER SOLUBLE SEGMENTED POLYMERS

David E. Farley, Pittsburgh, and Janice Elaine Morgan, Clinton, both of Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

Filed Jan. 13, 1975, Ser. No. 540,359
Int. Cl.² C08L *51/08*, *53/00*
U.S. Cl. 260—29.6 WQ 9 Claims

1. A method of preparing segmented polymers comprised of segments selected from homopolymers, copolymers and ter-

polymers of water-soluble vinyl monomers, and segments selected from poly(vinyl pyrrolidone) or poly(vinyl alcohol), which comprises the step of:

reacting, at a pH below 7.0, in an inverse emulsion environment which includes at least 4% by weight of the total system of one or more non-ionic surfactants having an HLB number of from about 7.0 to about 10.0, and in the presence of a cerium (IV) salt initiator, one or more water-soluble vinyl monomers and poly(vinyl pyrrolidone) or poly(vinyl alcohol).

4,002,590

COATING COMPOSITION FOR THICK COATING

Akitoshi Yoshida, Chiba; Masaharu Kosaka, Ichikawa, and Shigeki Inoue, Funabashi, all of Japan, assignors to Kikusui Kagaku Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Nov. 22, 1974, Ser. No. 526,409

Claims priority, application Japan, Nov. 27, 1973, 48-132212

Int. Cl.² C08K *3/00;* **C08L** *25/14*

U.S. Cl. 260—29.6 S **3 Claims**

1. A coating composition for thick coating in an amount of from 1 to 20 kg/m² comprising a coating liquid containing water, aqueous silica sol, an aqueous dispersion of butyl acrylate-methyl acrylate-styrene copolymer and an aggregate, wherein said coating liquid contains from 5 to 40% by weight as SiO_2 of colloidal silica, 3 to 40% by weight of said copolymer, a SiO_2/M_2O mole ratio, wherein M is an alkali metal atom selected from the group consisting of Na, K, and Li, of from 7 to 2000 and has a viscosity lower than 100 c.p. at 20° C when kept in a sealed state at 50° C for 10 days.

4,002,591

COLORATION OF LINEAR POLYMERS BY CO-POLYCONDENSATION WITH PIGMENTS

Philippe Yves Edouard Gangneux, Bihorel, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

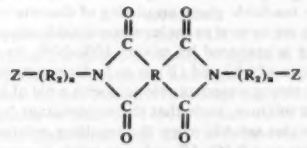
Filed Feb. 7, 1973, Ser. No. 330,332

Claims priority, application France, Feb. 7, 1972, 72.03976

Int. Cl.² C08K *5/34*

U.S. Cl. 260—37 N **4 Claims**

1. Process for forming a colored linear polyamide which comprises effecting the polycondensation of a monomer or monomers of the polyamide in the presence of a pigment of the polycyclic dicarboximide series containing two primary amine functional groups, wherein the pigment has the formula:



(I)

wherein R represents a tetravalent residue of a substituted or unsubstituted mono- or poly-cyclic aromatic hydrocarbon or the tetravalent residue of a substituted or unsubstituted perinone; *n* represents 0 or 1; R_2 represents a $C_1 - C_{10}$ aliphatic, phenyl or diphenyl radical; and Z represents a primary amine group; wherein said pigment is in an amount of from 1 part per 1000 to 2 parts per hundred parts by weight of said monomer or monomers; and wherein said monomer or monomers are selected from the group consisting of 11-amino-undecanoic acid, Σ-caprolactam, and p-phenylenediamine, decamethylenediamine or hexamethylenediamine together with terephthalic, isophthalic, adipic or sebacic acid.

4,002,592

FRICTION MATERIALS CONTAINING SPINEL SOLID SOLUTION AS FRICTION MODIFIER

Yehuda Baskin, South Euclid, Ohio, assignor to Ferro Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 548,014, Feb. 7, 1975, Pat. No. 3,959,208. This application Jan. 9, 1976, Ser. No. 646,613

Int. Cl.² C08J *5/14;* **C08K** *7/08*

U.S. Cl. 260—38 **20 Claims**

1. In friction material comprising a rigid, thermosetting, heat-resistant, organic resin and a friction modifier, the improvement comprising a crystalline mineral friction modifier of an isomorphous substitutional solid solution consisting essentially of atoms of metals and oxygen arranged as a mixed crystal in a normal spinel crystal lattice structure and corresponding to the formula:

$$AB_2O_4$$

in which A represents one or more monovalent or divalent metal atoms, B represents one or more trivalent, tetravalent, pentavalent, or hexavalent metal atoms, said metal atoms being substituted in and occupying sites in the normal spinel crystal lattice structure, there being at least three different metal atoms present and having a total valence charge of eight to maintain electrical neutrality, said normal spinel crystal lattice structure being present in an amount to impart a desired coefficient of friction to said material.

4,002,593

PROCESS FOR PRODUCING DISPERSIONS OF PIGMENTS IN CONDENSATION TYPE POLYMERS

Marlene J. Jones, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed July 17, 1975, Ser. No. 596,927

Int. Cl.² C08K *9/04;* **C09D** *17/00*

U.S. Cl. 260—40 P **10 Claims**

1. A process for producing an essentially agglomerate-free intimate pigment dispersion for use in coloring fiber and film-forming polymers, said dispersion consisting essentially of at least 10% by weight of pigment in a thermoplastic linear condensation type polymer, which process comprises the steps of

a. forming a liquid pigment dispersion of pigment particles having a size less than 3 microns in a normally liquid aliphatic or aromatic hydrocarbon diluent which is a nonsolvent for the pigment and for said polymer and is volatile at a temperature which is at least as high as the softening point of said polymer;

b. introducing a sufficient amount of said liquid pigment dispersion into a melt of said polymer to provide at least 10% of pigment by weight of the pigment plus polymer;

c. mixing said liquid pigment dispersion with said polymer while it is in the molten state until the pigment has transferred from the diluent phase to the polymer phase;

d. removing the diluent phase; and

e. recovering the pigment polymer phase.

4,002,594

SCORCH RETARDANTS FOR RUBBER REINFORCED WITH SILICEOUS PIGMENT AND MERCAPTO-TYPE COUPLING AGENT

Miles Q. Fetterman, Seville, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

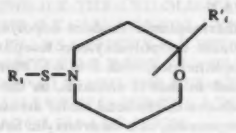
Filed July 8, 1975, Ser. No. 594,163

Int. Cl.² C08K *3/34, 3/36*

U.S. Cl. 260—42.37 **24 Claims**

1. A sulfur vulcanizable rubber compound comprising rubber; 5 to 200 parts per 100 parts of rubber of finely divided siliceous pigment; 0.1 to 15 parts per 100 parts of rubber of a coupling agent represented by the general formula A-R-B, wherein A represents a functional group capable of bonding to the siliceous pigment, B represents a sulfur functional group

selected from the group consisting of mercapto, halomercapto, thioepoxide, and disulfide groups, and R represents a stable group which connects A and B; 0.2 to 8 parts per 100 parts of rubber of sulfur curative; and 0.1 to 15 parts per hundred parts of rubber of a thiomorpholine scorch retardant represented by the formula:



wherein R_1 is an active group that will allow the thiomorpholine group to retard scorch, each R′ independently is an inert substituent, and *i*, the number of inert substitutents, is 0, 1, 2, or 3.

4,002,595

ELECTROPLATABLE POLYPROPYLENE COMPOSITIONS

Robert L. Adelman, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 428,725, Dec. 27, 1973, abandoned. This application Dec. 18, 1975, Ser. No. 641,949

Int. Cl.² C08K *3/04;* **C25D** *5/56*

U.S. Cl. 260—42.47 **15 Claims**

1. As a new composition of matter a polyolefinic blend capable of being electroplated without first being electrolessly plated, said blend comprising about:

a. 20 to 60 weight percent of propylene homopolymer or copolymer with an α-olefin having less than 10 carbon atoms, having a crystallinity of at least about 25 percent, the propylene content of said copolymer being at least 92 molar percent,

b. 4 to 20 weight percent of an ethylene homopolymer or copolymer with an α-olefin having less than 10 carbon atoms, having a crystallinity of at least about 25 percent, the ethylene content of said copolymer being at least 88 molar percent,

c. 1 to 15 weight percent of a low polarity rubber having a low enough polarity to result in the electrical volume resistivity of the blend being less than about 25 ohm-cm in the injection-molded condition,

d. 12 to 45 weight percent carbon black, having an average particle size less than about 40 mμ, and a volatile content of less than about 3 weight percent, at least 15% of the total of said carbon black being a high conductivity black having a dibutyl phthalate oil absorption value of at least about 1.00 cc./gm., an iodine adsorption number greater than about 160 mg./g., and

e. optionally up to 45 weight percent silicate mineral additive dispersed in said blend, substantially all of said additive being of a size that will pass through a screen having 44 micron opening, and at least 60% of the particles being smaller than 10 microns in cross sectional dimension,

provided that when said mineral additive is used, the combined amounts of mineral additive and carbon black are between 35 and 60% by weight of the blend.

4,002,596

HALOALKOXY DERIVATIVES OF THE CYCLOPHOSPHONITRILIC CHLORIDE-HEXAMETHYLPHOSPHORAMIDE ADDUCT

Robert M. Murch, Ashton, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 436,778, Jan. 25, 1974, Pat. No. 3,927,147. This application Sept. 10, 1975, Ser. No. 612,139

Int. Cl.² C08K *5/51*

U.S. Cl. 260—45.9 NP **5 Claims**

1. A method for enhancing the fire retardancy characteristics of general purpose polyester resins which comprises, reacting the equimolar adduct of $(PNCl_2)_3$ and $(Me_2N)_3PO$ with an alcohol selected from the class consisting of β-chloroethanol, 3,3,3-trichloroethanol, 1,3-dichloro-2 propanol, and 2,3-dibromopropanol in an alcohol-to-adduct mole ratio of 4:1 to form an alkoxy derivative, and adding said alkoxy derivative to said polyester resin such that said alkoxy derivative is present in an amount ranging from about 5% to 20% by weight.

4,002,597

SMOKE RETARDANT VINYL CHLORIDE AND VINYLIDENE CHLORIDE POLYMER COMPOSITIONS

Elmer Douglas Dickens, Jr., Richfield, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Jan. 15, 1976, Ser. No. 649,411

Int. Cl.² C08K *5/28, 5/09, 3/38, 3/32, 3/22, 3/24*

U.S. Cl. 260—45.75 N **21 Claims**

1. A smoke retardant composition comprising a vinyl chloride or vinylidene chloride polymer together with (A) at least one nickel compound selected from the group consisting of $NiCrO_4$, $NiMoO_4$, Ni_2O_3, $Ni_3(PO_4)_2$, nickel metal, nickel formate and nickel oxalate and (B) at least one vanadium compound selected from the group consisting of $LaVO_4$, Na_2VO_4, VB_2, VN, V_2O_3, and vanadium metal, said compounds (A) and (B) being compounds or hydrates thereof, and said compounds (A) and (B) being present in a total amount from about 0.25 to about 20 weight parts per 100 weight parts of polymer.

4,002,598

POLYETHER UREA EPOXY CURING AGENT

Harold George Waddill, and Heinz Schulze, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Mar. 6, 1975, Ser. No. 555,844

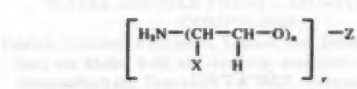
Int. Cl.² C08G *30/14*

U.S. Cl. 260—47 EN **28 Claims**

1. A curable epoxy resin composition consisting essentially of:

a vicinal polyepoxide; and,

an effective amount of a polyether urea curing agent having terminal primary amino groups and being formed by the reaction of a compound selected from a group consisting of urea and urea forming compounds with a polyoxyalkylenepolyamine of the formula:



wherein X is a hydrogen, a methyl radical, or an ethyl radical; Z is a hydrocarbon radical having 2 to 5 carbon atoms forming from 2 to 4 external ether linkages, *n* is a number from 1 to about 15, and *r* is a number from 2 to 4 wherein the molar ratio of said compound to said polyoxyalkylenepolyamine is about 0.50 to 0.83.

4,002,599

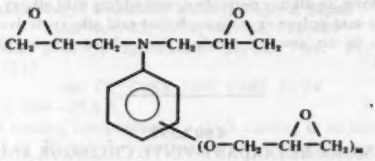
EPOXY RESIN COMPOSITIONS FROM GLYCIDYL DERIVATIVES OF AMINOPHENOLS CURED WITH TETRACARBOXYLIC DIANHYDRIDES

James A. Graham, Erie, Pa., assignor to Lord Corporation, Erie, Pa.

Filed Nov. 6, 1975, Ser. No. 629,342
Int. Cl.² C08G *59/32, 59/42*
U.S. Cl. 260—47 EA 40 Claims

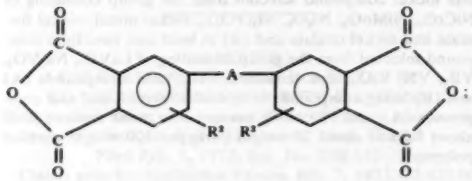
1. A room temperature stable two-pack epoxy resin system consisting essentially of

a. a first pack comprising at least one polyglycidyl aminophenol having the structure

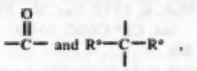


wherein *m* is 1 or 2, and

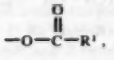
b. a second pack comprising at least one biphenyl anhydride having the structure



wherein A is selected from the group consisting of



wherein each R^0 is individually a monovalent radical selected from the group consisting of hydrogen, halogen, hydroxy, alkyl radical having from 1 to 5 carbon atoms, alkoxy radical having from 1 to 5 carbon atoms and



wherein R^1 is an alkyl radical having from 1 to 5 carbon atoms; and

wherein each R^2 is individually a monovalent radical selected from the group consisting of hydrogen, halogen, alkyl radical having from 1 to 5 carbon atoms, $-NO_2$, $-COOH$, $-SO_3H$, and $-NH_2$.

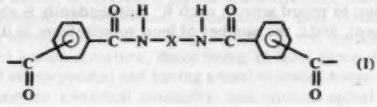
4,002,600

LINEAR COPOLYESTERS BASED ON TEREPHTHALIC ACID AND/OR ISOPHTHALIC ACID, A PROCESS FOR THEIR MANUFACTURE AND THEIR USE

Jürgen Habermeier, Pfeffingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 449,175, March 7, 1974, abandoned. This application Nov. 5, 1975, Ser. No. 629,154
Claims priority, application Switzerland, Mar. 27, 1973, 04399/73
Int. Cl.² C08G *63/68*
U.S. Cl. 260—75 N 2 Claims

1. A linear, thermoplastic random copolyester containing amide groups bases on polyalkylene terephthalates and/or polyalkytene isophthalates, with 2 to 6 C atoms in the alkylene, characterized in that it contains, as the cocomponent, 5–75 mole %, relative to the total molar amount of the dicarboxylic acid components, of a dicarboxylic acid diamide radical of the formula I



wherein the two carbonyl groups located on the aromatic ring are in the para-position or meta-position to one another and X is a cycloaliphatic or cycloaliphatic-aliphatic radical.

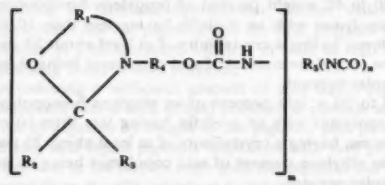
4,002,601

URETHANE OXAZOLIDINES

Manfred Hajek, Cologne, and Kuno Wagner, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 18, 1975, Ser. No. 614,470
Claims priority, application Germany, Sept. 28, 1974, 2446438
Int. Cl.² C08G *18/06;* C07D *265/04*
U.S. Cl. 260—77.5 AT 6 Claims

1. Compounds corresponding to the following general formula:



wherein

m represents an integer of from 1 to 6;

n represents an integer of from 0 and 4;

R_1 represents an aliphatic hydrocarbon group containing from 2 to 6 carbon atoms;

R_2 and R_3 which may be the same or different, each represents hydrogen, an aliphatic hydrocarbon containing from 1 to 4 carbon atoms, a cycloaliphatic hydrocarbon group containing from 5 to 7 carbon atoms, or an aromatic hydrocarbon group containing from 6 to 10 carbon atoms, or when taken together with the ring carbon atom they may form a 5- or 6-membered cycloaliphatic hydrocarbon ring;

R_4 represents an aliphatic hydrocarbon group containing from 2 to 6 carbon atoms; and

R_5 represents a residue of the type which may be obtained by removal of the isocyanate groups from an organic (n + m)-valent polyisocyanate.

4,002,602

UBIQUITOUS IMMUNOPOIETIC POLYPEPTIDE (UBIP) AND METHODS

Gideon Goldstein, 4455 Douglas Ave., Riverdale, N.Y. 10471

Continuation-in-part of Ser. No. 449,686, March 11, 1974, abandoned. This application Aug. 22, 1975, Ser. No. 606,844

Int. Cl.² C07C *103/52*; C07G *7/00*; A61K *37/00*

U.S. Cl. 260—112.5 R 12 Claims

1. A polypeptide which has the following amino acid sequence:

H_2N-MET-GLN-ILE-PHE-VAL-LYS-THR-LEU-THR-GLY-LYS-THR-ILE-THR-LEU-GLU-VAL-GLU-PRO-SER-ASP-THR-ILE-GLU-ASN-VAL-LYS-ALA-LYS-ILE-GLN-ASP-LYS-GLU-GLY-ILE-PRO-PRO-ASP-GLN-GLN-ARG-LEU-ILE-PHE-ALA-GLY-LYS-GLN-LEU-GLU-ASP-GLY-ARG-THR-LEU-SER-ASP-TYR-ASN-ILE-GLN-LYS-GLU-SER-THR-LEU-HIS-LEU-VAL-LEU-ARG-LEU-ARG-COOH.

4,002,603

POLYVALENT METAL SALTS OF 7-HYDROXY-8-[p-(PHENYLAZO)PHENYLAZO]-1,3-NAPHTHALENEDISULFONIC ACID FOR DYEING FIBERGLASS

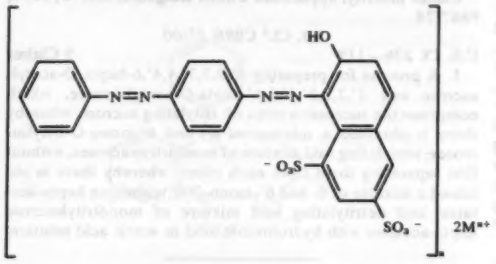
Woodrow Wilson Robbins, Bound Brook; Herbert Soffer, Fanwood, and Richard Benjamin Balsley, Lebanon, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Aug. 28, 1974, Ser. No. 501,301

Int. Cl.² C09B *45/24*, *31/02*; D06P *3/80*

U.S. Cl. 260—148 4 Claims

1. A dye represented by the following formula:



wherein M is selected from the group consisting of calcium, barium, strontium, magnesium, chromium, manganese, iron, cobalt, nickel, copper and zinc and wherein *n* is an integer selected from 2 and 3.

4,002,604

AZO DYESTUFF INCLUDING A 1,3 OR 1,4-BENZODIOXAN RING STRUCTURE FUSED TO A THIAZOLE RING

David Melville Fawkes, and John Lindley Leng, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

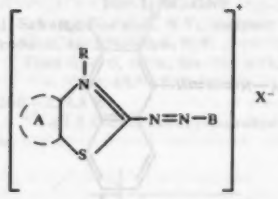
Filed Nov. 26, 1975, Ser. No. 635,423

Claims priority, application United Kingdom, Dec. 18, 1974, 54617/74

Int. Cl.² C09B *29/36*

U.S. Cl. 260—155 14 Claims

1. An azo dyestuff devoid of carboxylic acid and sulphonic acid groups and of the formula I



(I)

wherein A is a 1,3 or 1,4-benzodioxan ring structure fused to the thiazole ring via the benzene ring, B is the radical of a para-coupling amine or an indole, R is an optionally substituted alkyl, alkenyl, cycloalkyl or aralkyl radical and X is an anion.

4,002,605

CALCIUM AND MAGNESIUM SALTS OF 4-(2-HYDROXY-1-NAPHTHYLAZO)-1-NAPHTHALENESULFONIC ACID FOR DYEING FIBERGLASS

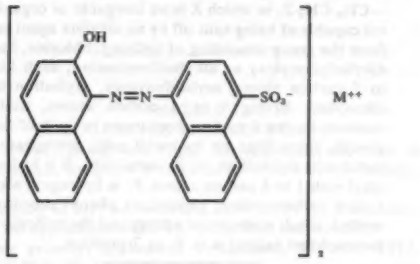
Richard Benjamin Balsley, Lebanon; Herbert Soffer, Fanwood, and Woodrow Wilson Robbins, Bound Brook, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Aug. 28, 1974, Ser. No. 501,302

Int. Cl.² C09B *29/16*; D06P *3/80*; C03C *13/00*

U.S. Cl. 260—195 3 Claims

1. A dye represented by the formula:



where M is selected from the group consisting of calcium and magnesium; provided that where M is calcium, said dye is characterized by an X-ray diffraction pattern with lines at interplanar spacings in Angstroms of 17.4, 8.66, 7.62 and 3.54 and relative intensities of 45, 10, 100 and 10, respectively.

4,002,606

WATER-SOLUBLE PHENYL-AZO-NAPHTHYL COMPOUNDS

Ludwig Schläfer, Fischbach, Taunus, and Ernst Hoyer, Frankfurt am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

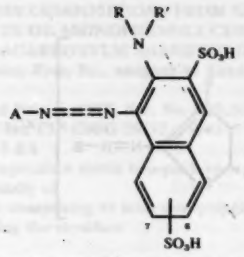
Filed Sept. 3, 1974, Ser. No. 502,501

Claims priority, application Germany, Sept. 3, 1973, 2344333

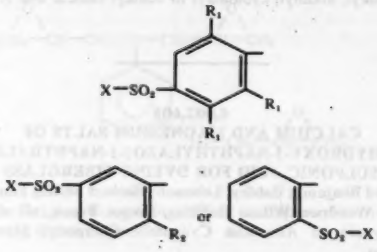
Int. Cl.² C09B *29/06*; D06P *3/10*, *3/24*, *3/66*

U.S. Cl. 260—196 9 Claims

1. Water-soluble monoazo compound which, in the form of the free acid, corresponds to the formula



wherein A is



wherein

R_1 are identical or different, and each is hydrogen, chorine, alkyl with 1 to 4 carbon atoms, or alkoxy with 1 to 4 carbon atoms,

R_2 is hydrogen, chlorine, bromine, sulfo, sulfonic acid amide or alkoxy of 1 to 4 carbon atoms, X is vinyl or $-CH_2-CH_2-Z$, in which Z is an inorganic or organic radical capable of being split off by an alkaline agent selected from the group consisting of hydroxy, chlorine, bromine, alkylsulphonyloxy or alkylsulfonylamino, each having 1 to 5 carbon atoms, arylsulfonyloxy, arylsulfonylamino, alkanyloxy having 1 to 4 carbon atoms, trialkylammonium having 1 to 4 carbon atoms in each of the alkyl groups, thiosulfato or its metal salts, phosphato or its metal salts and sulfato, or its metal salts, R is hydrogen or alkyl with 1 to 4 carbon atoms, R′ is hydrogen, alkyl with 1 to 4 carbon atoms, phenyl, or phenyl substituted by methyl, ethyl, methoxy or ethoxy and the sulfonic acid in the naphthyl radical is in 6- or 7-position.

4,002,607

AZO DYES HAVING AN AMINO GROUP PARA TO THE AZO LINKAGE

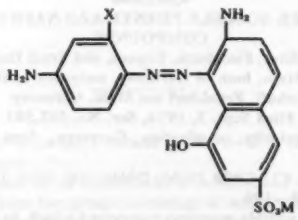
John H. McLeod, Tonawanda, N.Y., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Oct. 25, 1974, Ser. No. 517,979

Int. Cl.² C09B *43/08*

U.S. Cl. 260—198 **3 Claims**

1. A monoazo dyestuff having the formula



wherein X is Cl, Br or CN and M is an alkali metal or hydrogen.

4,002,608

1-N-ALKYL-AMINOGLYCOSIDE-XK-88 DERIVATIVES AND METHODS FOR THEIR MANUFACTURE

John J. Wright; Peter J. L. Daniels, both of Cedar Grove; Alan K. Mallams, West Orange, and Tattanahalli L. Nagabhushan, Parsippany, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Nov. 4, 1975, Ser. No. 628,638

Int. Cl.² C07H *15/22*

U.S. Cl. 536—17 **8 Claims**

1. A 1-N-X-4,6-di-O-(aminoglycosyl)-2-deoxystreptamine selected from the group consisting of 1-N-X-Aminoglycoside-XK-88-1, 1-N-X-Aminoglycoside-XK-88-3, and 1-N-X-Aminoglycoside-XK-88-5;

wherein X is an alkyl substituent selected from the group consisting of alkyl, alkenyl, aralkyl, hydroxyalkyl, cycloalkylalkyl, aminoalkyl, alkylaminoalkyl, aminohydroxyalkyl, and alkylaminohydroxyalkyl, said alkyl substituent having up to 8 carbon atoms, the carbon in said alkyl substituent adjacent to the aminoglycoside nitrogen being unsubstituted, and when said alkyl substituent is substituted by both hydroxyl and amino functions, only one of said functions can be attached at any one carbon atom;

and the pharmaceutically acceptable acid addition salts thereof.

4,002,609

SUCROSE DERIVATIVES

Riaz Ahmed Khan, Sonning, England, assignor to Tate & Lyle Limited, London, England

Filed Feb. 24, 1975, Ser. No. 552,205

Claims priority, application United Kingdom, Mar. 5, 1974, 9867/74

Int. Cl.² C08B *37/00*

U.S. Cl. 536—119 **9 Claims**

1. A process for preparing 1′,2,3,3′,4,4′,6-hepta-O-acetylsucrose and 1′,2,3,3′,4′,6,6′-hepta-O-acetylsucrose, which comprises the successive steps of: tritylating sucrose, whereby there is obtained a mixture of 6- and 6′-mono-O-tritylsucroses; acetylating said mixture of monotritylsucroses, without first separating them from each other, whereby there is obtained a mixture of 6- and 6′-mono-O-tritylsucrose hepta-acetates; and detritylating said mixture of monotritylsucrose hepta-acetates with hydrobromic acid in acetic acid solution.

4,002,610

2-AMINOBENZODIAZEPINE-5-ONES

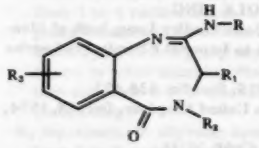
Richard J. Mohrbacher, Maple Glen, and Philip P. Grous, Philadelphia, both of Pa., assignors to McNeil Laboratories, Incorporated, Fort Washington, Pa.

Filed Sept. 22, 1975, Ser. No. 615,667

Int. Cl.² C07D *243/20*

U.S. Cl. 260—239.3 D **13 Claims**

1. A compound selected from the group consisting of a 2-aminobenzodiazepine-5-one of the formula:



and the therapeutically active non-toxic acid addition salts thereof, wherein:

R is a member selected from the group consisting of hydrogen, arylloweralkyl, indolylloweralkyl, diloweralkylaminoloweralkyl and aryl;

R_1 is a member selected from the group consisting of hydrogen and aryl;

R_2 is loweralkyl; and

R_3 is a member selected from the group consisting of hydrogen, halo, nitro, loweralkoxy and loweralkyl;

provided, that, when R is hydrogen, then said R_1 is aryl; the aforementioned term aryl in each occurrence being a member selected from the group consisting of phenyl, trifluoromethylphenyl and phenyl substituted with from 1 to 3 members selected from the group consisting of halo, loweralkyl, hydroxy, and loweralkoxy.

4,002,611

PREPARATION OF BENZODIAZEPINES

Hisao Yamamoto, Nishinomiya; Shigeho Inaba, Takarazuka; Tadashi Okamoto, Ashiya; Toshiyuki Hirohashi, Kobe; Kikuo Ishizumi, Minoo; Michihiro Yamamoto, Takarazuka; Isamu Maruyama, Minoo; Kazuo Mori, Kobe, and Tsuyoshi Kobayashi, Minoo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

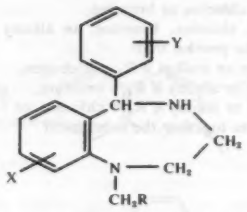
Filed Feb. 7, 1969, Ser. No. 797,663

Claims priority, application Japan, Feb. 13, 1968, 43-8951; Mar. 5, 1968, 43-14449; Mar. 6, 1968, 43-14830; Mar. 12, 1968, 43-16332; May 8, 1968, 43-31142

Int. Cl.² C07D *243/16*

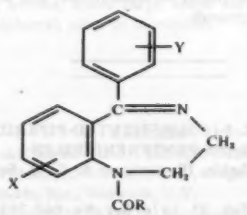
U.S. Cl. 260—239 BD **4 Claims**

1. A process for preparing 1-alkyl-1,2,4,5-tetrahydro-3H-1,4-benzodiazepine derivatives, and acid-addition salts thereof, represented by the formula,



(I)

wherein R signifies a hydrogen atom or an alkyl group having 1 to 3 carbon atoms, and X and Y signify respectively a hydrogen atom, a halogen atom or a trifluoromethyl group; comprising contacting a 1-(C_1–C_4 alkanoyl)-2,3-dihydro-1H-1,4-benzodiazepine derivative, or an acid-addition salt thereof, represented by the formula,



(II)

wherein R, X and Y are as defined above, with a lithium aluminum hydride.

4,002,612

1-(3,4-DICHLOROBENZYL)HEXAHYDRO-1,3-DIAZEPIN-2(1H)-ONE

Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Apr. 5, 1976, Ser. No. 673,374

Int. Cl.² C07D *243/04*

U.S. Cl. 260—239.3 R **1 Claim**

1. 1-(3,4-Dichlorobenzyl)hexahydro-1,3-diazepin-2(1H)-one.

4,002,613

10-(3,4-DICHLOROBENZYL)DIBENZ[B,F][1,4]OXAZEPIN-11-ONE

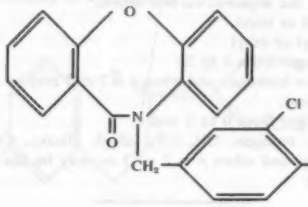
Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,225

Int. Cl.² C07D *267/20*

U.S. Cl. 260—239.3 T **1 Claim**

1. The compound of the formula:



4,002,614

HALOGENATED 19-NORSTEROIDS

Georg Anner, Basel, and Peter Wieland, Oberwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

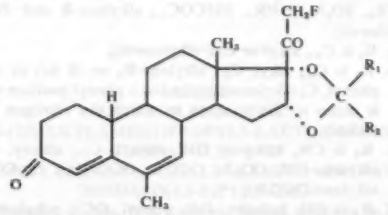
Continuation of Ser. No. 442,931, Feb. 15, 1974, abandoned. This application Sept. 25, 1975, Ser. No. 616,518

Claims priority, application Switzerland, Feb. 28, 1973, 2950/73; Dec. 20, 1973, 17898/73

Int. Cl.² C07J *21/00*

U.S. Cl. 260—239.55 D **4 Claims**

1. A 21-fluoro-19-norpregnadiene compound of the general formula



wherein R_1 and R_2 each individually denote a lower alkyl, lower cycloalkyl, phenyl or benzyl radical or together with the adjacent carbon atom form the cyclopentane or the cyclohexane ring.

4,002,615
TERPENOID COMPOUNDS OF SUBSTITUTED HYDROXYALKYL-PYRIDINES HAVING JUVENILE HORMONE ACTIVITY

Hauk Solli, Harboor; Per Dausell Klemmensen, Lemvig; Preben Lindholm Holst, Harboor, and Hans Berg Madsen, Bovlingbjerg, all of Denmark, assignors to A/S Cheminova, Lemvig, Denmark

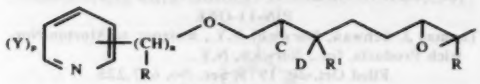
Filed July 25, 1974, Ser. No. 491,970

Claims priority, application United Kingdom, Mar. 13, 1974, 11201/74

Int. Cl.² C07D *405/12*

U.S. Cl. 260—240 H **9 Claims**

1. A novel chemical compound of the general formula (I):



wherein

C is hydrogen,

D is hydrogen,

C and D when taken together form a further single bond between the adjacent carbon atoms,

R is methyl or ethyl,

R_1 is methyl or ethyl

n is an integer from 1 to 3,

R_2 is alkyl or hydrogen and when *n* is 2 or 3 may be the same or different,

p is an integer from 0 to 3 and

Y is NO_2, halogen, OH, CF_3, alkyl, alkoxy, COOH or COOalkyl and when *p* is 2 or 3 or may be the same or different.

4,002,616
DISPERSE BISANIL DYES DERIVED FROM DIAMINOMALEONITRILE AND THEIR PREPARATION

John Fred Neumer, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 430,416, Jan. 3, 1974, Pat. No. 3,927,065. This application June 30, 1975, Ser. No. 592,205

Int. Cl.² C07D *333/04*, *209/14*

U.S. Cl. 260—240 G **21 Claims**

1. Bisanil dye of the formula

$$Ar_1\text{-}CH{=}N\text{-}C(CN){=}C(CN)\text{-}N{=}CH\text{-}Ar_2$$

wherein each of Ar_1 and Ar_2 is independently selected from

1. benzo(5- and 6-membered)heterocyclic groups containing 0–4 methyl substituents and
2. phenyl, naphthyl, 5-membered heterocyclic and 6-membered heterocyclic groups containing 0–3 substituents selected from NO_2, halogen, CN, C_{1-4} alkyl, C_{1-4} alkoxy, OCH_2-phenyl, phenyl, CF_3, OH, OC_{1-4} alkylene-$N(C_{1-4}$ alkyl$)_2$, C_{2-4} alkylene-Cl, $NHCONH_2$, NHCOA, $NHSO_2A$, SR_3, SO_2R_3, NHR_1, $NHCOC_{1-4}$ alkylene-B and $-NR_1R_2$ wherein:

a. R_1 is C_{1-4} alkyl or C_{2-4} alkylene-R_5;

b. R_2 is C_{1-4} alkyl, C_{2-4} alkylene-R_4 or, if Ar_1 or Ar_2 is phenyl, C_3 alkylene attached to a phenyl position which is ortho to the position to which the nitrogen is attached;

c. R_3 is CN, halogen, OH, phenyl, C_{1-4} alkoxy, OC_{1-4} alkylene-CN, CO_2A, OCOA, OCONHA or CO_2C_{1-4} alkylene-OCOA;

d. R_4 is CN, halogen, OH, phenyl, OC_{1-4} alkylene-CN, CO_2A, OCOA, CO_2C_{1-4} alkylene-OCOA, SO_2A, phthalimido, succinimido, glutarimido, $OCOCH{=}CH_2$, $CH_2\text{-}CH(OCOA)CH_2OA$ or $CH_2CH(OCONHA)CH_2OA$;

e. A is C_{1-4} alkyl or R_5;

f. B is halogen, C_{1-4} alkoxy or R_5;

g. R_5 is phenyl containing 0–2 substituents selected from C_{1-4} alkyl, C_{1-4} alkoxy, halogen, NO_2, CN, C_{1-4} alkyl-CONH and NR_6R_7 wherein each of R_6 and R_7 is independently selected from H and C_{1-4} alkyl, with at least one of R_6 and R_7 being C_{1-4} alkyl; and

h. R_6 is C_{1-4} alkyl, C_2H_4OH, C_{3-6} cycloalkyl or R_5; with at least one of Ar_1 and Ar_2 being a heterocyclic group selected from (1) and (2).

4,002,617
HYDRODIPYRANO-PHTHALAZINE COMPOUNDS

Fritz Eiden, and Claus Schmiz, both of Munich, Germany, assignors to Chem. Pharmaz. Fabrik Dr. Herman Thiemann G.m.b.H., Lunen, Germany

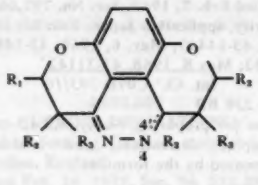
Filed Nov. 5, 1975, Ser. No. 628,963

Claims priority, application Germany, Nov. 4, 1974, 2452491

Int. Cl.² C07D *237/26*

U.S. Cl. 260—240 F **2 Claims**

1. A hydrodipyrano-phthalazine compound of the formula:



wherein

R_1 = hydrogen or lower alkyl,

R_2 = hydrogen, chlorine or bromine,

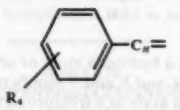
R_3 = hydrogen, chlorine, bromine, an alkoxy or aralkyl group, with the proviso that:

R_3 = hydrogen or aralkyl if R_2 = hydrogen,

R_3 = bromine or alkoxy if R_2 = bromine,

R_3 = chlorine or alkoxy if R_2 = chlorine, or

R_2 and R_3 form together the substituent



wherein

R_4 = hydrogen, halogen, trifluoromethyl, alkyl, alkoxyl, alkylenedioxy, a possibly substituted amino group, or a nitro group.

the 4,4′-bond is saturated or unsaturated, and acid-addition salts of these compounds.

4,002,618
2,2-DIPHENYL-5-(4-SUBSTITUTED-PIPERIDINO)-3-TRANS-PENTENENITRILES

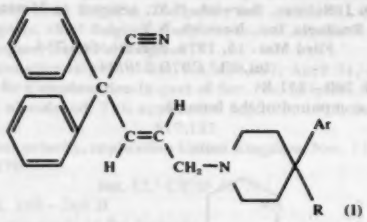
Chung H. Yen, Skokie, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed Feb. 23, 1976, Ser. No. 660,205

Int. Cl.² C07D *211/06*

U.S. Cl. 260—240 R **5 Claims**

1. A compound of the formula



(I)

wherein Ar is selected from the group consisting of phenyl, monosubstituted lower alkylphenyl wherein the alkyl portion contains 1 to 6 carbon atoms, and monosubstituted halophenyl; and R is selected from the group consisting of hydrogen, hydroxy, cyano, lower alkoxycarbonyl containing 2 to 7 carbon atoms, and carboxy.

4,002,619

COUMARINE DYESTUFFS OF THE DISPERSION SERIES

Siegfried Dengler, Choex; Peter Loew, Munchenstein; Christian Zickendraht, Binningen, and Hansrudolf Schwander, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

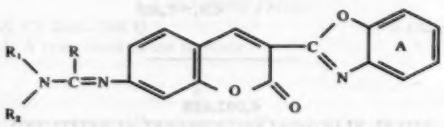
Filed June 17, 1974, Ser. No. 479,919

Claims priority, application Switzerland, June 29, 1973, 9504/73

Int. Cl.² C07D *405/00, 413/00*

U.S. Cl. 260—240 G **3 Claims**

1. A dyestuff of the formula



wherein

R, R_1 and R_2 are individually alkyl of 1 to 4 carbon atoms, unsubstituted or substituted by chloro, hydroxy, cyano, methoxy, acetoxy, butyryloxy, methoxycarbonyl, ethoxycarbonyl or phenyl; or are phenyl or phenyl substituted by methyl, ethyl, propyl, methoxy, ethoxy, cyano, chloro, bromo, nitro or acetylamino; and

R and R_1 additionally represents hydrogen, or R_1 and R_2 together additionally represent, together with the nitrogen to which they are attached, the piperidine ring;

and the benzene ring A is unsubstituted or substituted by chloro; bromo; lower alkyl; lower alkoxy; acetyl; lower alkylsulphonyl; nitro or thiocyano.

4,002,620

2-ANILINO-4H-3,1-BENZOTHIAZINES

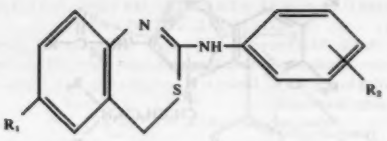
Stanford S. Pelosi, Jr., Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,228

Int. Cl.² C07D *279/08*

U.S. Cl. 260—243 R **7 Claims**

1. A compound of the formula:



wherein R_1 is hydrogen and R_2 represents 4-dimethylamino, 5-chloro-2,4-dimethoxy or 3,4-dichloro; and R_1 is chloro and R_2 represents 4-acetyl or 3-chloro.

4,002,621

6-CHLORO-2-(3,4-DICHLOROANILINO)-4H-3,1-BENZOTHIAZINE

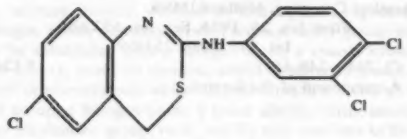
Stanford Salvatore Pelosi, Jr., Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,227

Int. Cl.² C07D *279/08*

U.S. Cl. 260—243 R **1 Claim**

1. The compound 6-chloro-2-(3,4-dichloroanilino)-4H-3,1-benzothiazine of the formula:



4,002,622

2-(3-CHLOROANILINO)-4H-3,1-BENZOTHIAZINE

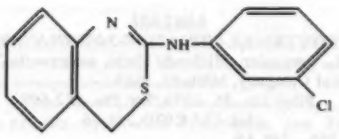
Stanford Salvatore Pelosi, Jr., Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,226

Int. Cl.² C07D *279/08*

U.S. Cl. 260—243 R **1 Claim**

1. The compound 2-(3-chloroanilino)-4H-3,1-benzothiazine of the formula:



4,002,623

ANTI-INFLAMMATORY 1-[3-(DIALKYLAMINO)PROPYL]-2-ACYLAMINOBENZIMIDAZOLES AND 2-ACYLAMINO-3-[3-(DIALKYLAMINO)-PROPYL-]IMIDAZO[4,5-b]PYRIDINES

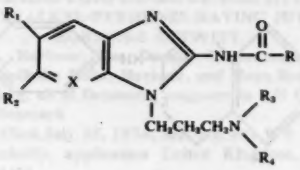
Saul Bernard Kadin, New London, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Aug. 7, 1974, Ser. No. 495,375

Int. Cl.² C07D *295/00*

U.S. Cl. 260—247.2 A **20 Claims**

1. A compound having the formula:



and pharmaceutically acceptable acid addition salts thereof wherein R is styryl, chlorostyryl, phenyl, or mono- or di-substituted phenyl wherein each substituent is chloro, bromo, fluoro, trifluoromethyl, phenyl, alkoxy or alkyl said alkoxy or alkyl having from 1 to 4 carbon atoms; R_1 and R_2 are each hydrogen, chloro, bromo, fluoro, trifluoromethyl, methoxy or methyl; X is carbon; and R_3 and R_4 when taken separately are each alkyl having from 1 to 4 carbon atoms and when taken together with the nitrogen to which they are attached form a piperidino, pyrrolidino, morpholino, piperazino, 4-benzylpiperazino or 4-alkylpiperazino ring said alkyl having from 1 to 4 carbon atoms.

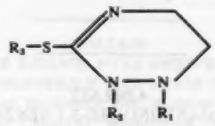
4,002,624

SUBSTITUTED-3-THIO-1,2,4-TRIAZINES

Donald L. Trepanier, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jan. 26, 1976, Ser. No. 652,606
Int. Cl.² C07D *253/06*
U.S. Cl. 260—248 AS **5 Claims**

1. A compound of the formula



wherein

R_1 represents hydrogen or a lower alkyl group of from 1 to about 3 carbon atoms,

R_2 and R_3 independently represent benzyl, para-chlorobenzyl, diphenylmethyl, and 10,11-dihydro-5H-dibenzo(a,d)-cyclohepten-5-yl and the addition salts thereof.

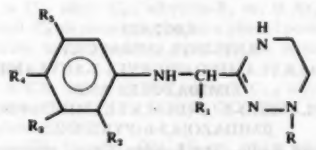
4,002,625

SUBSTITUTED 1,2,4-TRIAZINE-3-METHANAMINES

Donald L. Trepanier, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jan. 26, 1976, Ser. No. 652,607
Int. Cl.² C07D *253/06*
U.S. Cl. 260—248 AS **4 Claims**

1. A compound of the formula



and the addition salts thereof, wherein R and R_1 independently represent hydrogen or a lower alkyl of from 1 to 3 carbon atoms and R_2, R_3, R_4, and R_5 independently represent hydrogen, methyl, trihalomethyl, or a halogen.

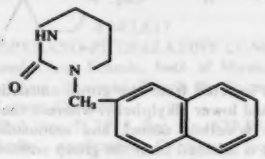
4,002,626

1-(2-NAPHTHYLMETHYL)-3,4,5,6-TETRAHYDRO-2(1H)PYRIMIDONE

Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Mar. 15, 1976, Ser. No. 666,754
Int. Cl.² C07D *239/04*
U.S. Cl. 260—251 R **1 Claim**

1. A compound of the formula:



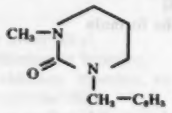
4,002,627

1-BENZYL-3-METHYL-3,4,5,6-TETRAHYDRO-2(1H) PYRIMIDONE

Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Mar. 26, 1976, Ser. No. 670,651
Int. Cl.² C07D *239/04*
U.S. Cl. 260—251 R **1 Claim**

1. A compound of the formula:



4,002,628

NOVEL FLUOROALKOXYPHENYL-SUBSTITUTED NITROGEN

Robert Lee Benefiel, Manila, and Eriks Viktor KrumRalns, Indianapolis, both of Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 371,106, June 18, 1973, Pat. No. 3,967,949. This application Dec. 17, 1975, Ser. No. 641,403
Int. Cl.² C07D *239/26*
U.S. Cl. 260—251 R **4 Claims**

1. A compound of the formula

wherein

R is 5-pyrimidyl;

R^1 is phenyl, pyridyl, C_1–C_{12} alkyl or C_3–C_8 cycloalkyl;

R^2 is trifluoromethoxyphenyl, tetrafluoroethoxyphenyl, pentafluoroethoxyphenyl, or 2,2,4,4-tetrafluoro-1,3-benzodioxanyl;

X is hydrogen, hydroxy, lower alkoxy, lower alkylthio, or lower alkanoyloxy;

and the nonphytotoxic acid addition salts thereof.

4,002,629

CERTAIN PYRIDINE CARBOXAMIDE DERIVATIVES

Jacques E. Delarge, Dolembreux; Leopold N. Thunus, Liege; Charles-Leon Lapiere, Tongeren, and Andre H. Georges, Ottignies, all of Belgium, assignors to A. Christiaens Societe Anonyme, Brussels, Belgium

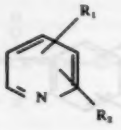
Continuation-in-part of Ser. No. 459,987, April 11, 1974, which is a continuation-in-part of Ser. No. 197,139, Nov. 9, 1971, abandoned. This application Sept. 26, 1975, Ser. No. 617,127

Claims priority, application United Kingdom, Nov. 11, 1970, 53675/70

Int. Cl.² C07D *401/04*

U.S. Cl. 260—268 H 3 Claims

1. Compounds of the formula:



wherein R_1 in the 3- or 5-position of the pyridine nucleus represents carboxamido, lower alkyl carboxamido or di-lower alkyl carboxamido group; and R_2 in the 2-position represents the N-metyl-piperazinyl group, and the pharmaceutically acceptable salts of the compounds of formula I.

4,002,630

NOVEL AROMATIC O-HYDROXYALDEHYDES, A PROCESS FOR THEIR PREPARATION AND THEIR UTILIZATION

Theodor Papenfuhs, Frankfurt am Main, and Helmut Troster, Schneidhain, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

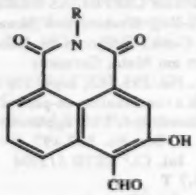
Filed July 22, 1975, Ser. No. 598,070

Claims priority, application Germany, July 26, 1974, 2436032

Int. Cl.² C07D *217/24*

U.S. Cl. 260—281 Q 5 Claims

1. A compound of the formula



in which R is alkyl of 1 – 4 carbon atoms, or alkyl of 1 to 4 carbon atoms substituted by hydroxy or alkoxy of 1 to 4 carbon atoms, or is cyclopentyl, cyclohexyl, benzyl or phenethyl.

4,002,631

TETRAHYDROQUINOLINE OR JUJOLIDINE DERIVATIVE OF A LACTONE COMPOUND OF PYRIDINE-CARBOXYLIC ACID

Yoshihide Miyazawa; Minoru Ozutsumi, and Satoshi Ogawa, all of Tokyo, Japan, assignors to Hodogaya Chemical Co., Ltd., Tokyo, Japan

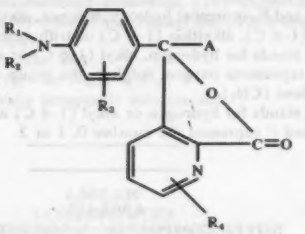
Filed July 24, 1974, Ser. No. 491,435

Claims priority, application Japan, July 24, 1973, 48-82649

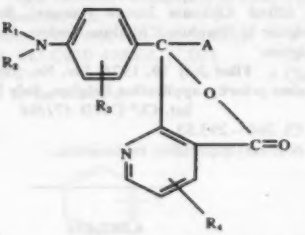
Int. Cl.² C07D *405/14*, *471/06*

U.S. Cl. 260—287 T 3 Claims

1. A lactone compound of a pyridine-carboxylic acid represented by the formula



or



or a mixture thereof, wherein R_1 and R_2 each represents a hydrogen atom, an acetyl group, a lower alkyl group which may be substituted with a halogen atom, a cyano, hydroxyl, lower alkoxy, lower alkylamino, acetyl or phenoxy group, or a benzyl or phenyl group which may be substituted with a lower alkyl group, a halogen atom, a lower alkoxy, nitro, amino or lower alkylamino group, or R_1 and R_2 may combine to form a hetereocyclic ring selected from the group consisting of morpholine, piperazine, piperidine and pyrrolidin-(1); R_3 represents a hydrogen or halogen atom, a nitro, amino, lower alkylamino group or a lower alkyl group which may be substituted with a halogen atom or a lower alkoxy group, a lower alkoxy group which may be substituted with a halogen atom, or a benzyl, benzyloxy or phenoxy group which may be substituted with a halogen atom, a lower alkyl, alkoxy or lower alkylamino group; R_4 represents a hydrogen or halogen atom, a lower alkyl group or a phenyl group; and A represents a julolidinyl or tetrahydroquinolyl group which may be substituted with a lower alkyl, lower alkylamino, acyl or nitro group; the alkyl moiety in said lower alkyl, lower alkoxy or lower alkylamino group having 1 to 5 carbon atoms.

4,002,632

TETRACYCLIC PIPERIDINO DERIVATIVES

Willem Jacob van der Burg, Heesch, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.

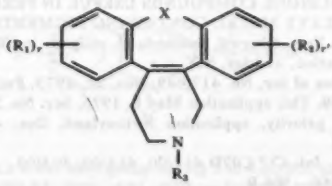
Filed Jan. 22, 1975, Ser. No. 543,199

Claims priority, application Netherlands, Jan. 31, 1974, 7401324

Int. Cl.² C07D *221/18*, *471/22*, *491/22*, *495/22*

U.S. Cl. 260—290 H 5 Claims

1. A compound of the formula:



or a pharmaceutically acceptable salt or nitrogen oxide thereof, in which

R_1 and R_2 represent hydroxy, halogen, alkyl (1–6 C), alkoxy (1–6 C), alkylthio (1–6 C) or trifluoromethyl,

R_3 stands for hydrogen, alkyl (1–6 C) or aralkyl (7–10 C),

X represents oxygen, sulphur, the group $>NR_4$ or methylene (CH_2),

R_4 stands for hydrogen or alkyl (1–4 C) and

r and r' represent the number 0, 1 or 2.

4,002,633

NOVEL COMPOUNDS: N-DISUBSTITUTED AMINO-ETHYL ESTERS OF RAUBASINE OF THE GENERAL FORMULA

Jean Alfred Alphonse Joseph Hannart, Brussels, Belgium, assignor to Omnium Chimique Societe Anonyme, Brussels, Belgium

Filed July 10, 1975, Ser. No. 594,875

Claims priority, application Belgium, July 26, 1974, 818145

Int. Cl.² C07D *471/04*

U.S. Cl. 260—293.53 **3 Claims**

1. N-β-ethylpiperidine raubasinate.

4,002,634

N-OXYPYRIDYL SUBSTITUTED CYSTEINE OR CYSTEINE DERIVATIVE THEREOF

Gregoire Kalopissis, Neuilly-sur-Seine, and Claude Bouillon, Eaubonne, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

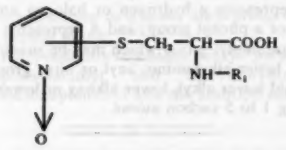
Continuation-in-part of Ser. No. 458,444, April 5, 1974, Pat. No. 3,917,815, which is a continuation-in-part of Ser. No. 69,936, Sept. 4, 1970, abandoned. This application Sept. 15, 1975, Ser. No. 613,563

Claims priority, application Luxembourg, Sept. 4, 1969, 59405; Feb. 20, 1970, 60384

Int. Cl.² C07D *213/28*

U.S. Cl. 260—294.8 F **4 Claims**

1. N-oxypyridyl derivative having the formula



wherein the sulfur atom is attached to the N-oxypyridyl nucleus in a position ortho or para to the NO group, and R_1 represents a member selected from the group consisting of hydrogen, COR_2 and SO_2R_2 wherein R_2 is selected from the group consisting of alkyl having 1–4 carbon atoms, phenyl and tolyl.

4,002,635

ISOINDOLINONE COMPOUNDS USEFUL IN PREPARING HEAVY METAL CONTAINING PIGMENTS

Christoph Frey, Oberwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

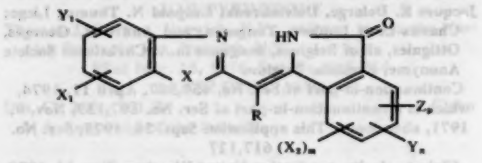
Division of Ser. No. 417,849, Nov. 21, 1973, Pat. No. 3,897,439. This application May 8, 1975, Ser. No. 575,672

Claims priority, application Switzerland, Dec. 4, 1972, 17625/72

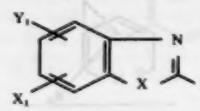
Int. Cl.² C07D *417/00, 413/00, 403/00*

U.S. Cl. 260—304 R **1 Claim**

1. An isoindolinone of the formula



wherein R denotes alkyl containing 1 to 4 carbon atoms, phenyl, cyano, alkoxycarbonyl containing 1 to 5 carbon atoms, phenoxycarbonyl, carbamoyl or a group of the formula



X denotes O, S or imino, X_1 and Y_1 denote H, halogen, alkyl containing 1 to 6 carbon atoms, alkoxy containing from 1 to 6 carbon atoms, alkoxycarbonyl containing from 1 to 6 carbon atoms, alkylsulphonyl containing from 1 to 6 carbon atoms, alkylcarbamoyl containing 1 to 6 carbon atoms, nitro, carbamoyl or phenylcarbamoyl, or the radicals X_1 and Y_1 form a fused benzene ring, X_2 denotes H, Y denotes halogen and Z denotes nitro, carbamoyl or phenylcarbamoyl selected from the group consisting of parachlorophenylcarbamoyl, phenylcarbamoyl, and para-methylphenylcarbamoyl, or a group of the formula R_1Y_2-, wherein R_1 representsH, alkyl represents H, from 1 to 6 carbon atoms, cycloalkyl containing 1 to 6 carbon atoms or phenyl and Y_2 represents O or S, m denotes 0-4, p denotes 0-3 and the sum of $m+n+p$ must be 4.

4,002,636

CERTAIN NOVEL SUBSTITUTED TETRAHYDRO-OXOTHIAZOLO-TRIAZOLIUM COMPOUNDS USEFUL AS HERBICIDES

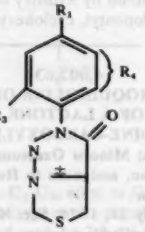
Marwan J. Abu-El-Haj, Groton, and James W. McFarland, Lyme, both of Conn., assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Division of Ser. No. 395,713, Sept. 10, 1973, Pat. No. 3,894,036, which is a continuation-in-part of Ser. No. 170,996, Aug. 11, 1971, abandoned. This application Dec. 13, 1974, Ser. No. 532,497

Int. Cl.² C07D *513/04*

U.S. Cl. 260—306.7 T **1 Claim**

1. A compound of the formula



wherein

R_1 is halogen; and

R_3 and R_4 are each hydrogen or halogen.

4,002,637
OXAZOLIDINE, OXAZOLIDINE-CONTAINING CONDENSATION AND ADDITION POLYMERS AND METHODS OF PRODUCING THEM

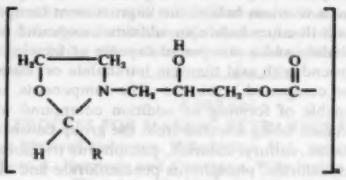
Sheldon N. Lewis, Zurich, Switzerland; Jerome F. Levy, Dresher, and Napoleon L. Horton, Philadelphia, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. Nos. 377,375, July 9, 1973, abandoned, and Ser. No. 377,377, July 9, 1973, Pat. No. 3,937,716. This application Jan. 10, 1975, Ser. No. 540,021

Int. Cl.² C07D *263/02*

U.S. Cl. 260—307 FA **12 Claims**

1. A compound of the formula:



(III)

wherein,

R is a member selected from hydrogen, alkyl having 1 to 8 carbon atoms, and benzyl

n is an integer having a value of 1, 2, or more,

R^1, when *n* is 1, is phenyl, benzyl, or alkyl or alkenyl of 2 to 10 carbon atoms,

R^1, when *n* is 2, is a covalent bond, an alkylene chain of 2 to 10 carbon atoms, an alkenylene chain of 2 to 10 carbon atoms, or phenylene, and

R^1, when *n* is more than 2, is a residue of a polycarboxylic acid selected from the group consisting of aconitic, trimesic, tricarballylic and citric acids.

4,002,638
BENZAZEPINE DERIVATIVES

Yutaka Kuwada, Ashiya; Hiroyuki Tawada, Osaka, and Kanji Meguro, Takarazuka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

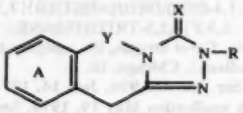
Filed Sept. 11, 1974, Ser. No. 505,088

Claims priority, application Japan, Sept. 14, 1973, 48-104256; Feb. 26, 1974, 49-023062; Jan. 10, 1974, 49-006173

Int. Cl.² C07D *249/12*

U.S. Cl. 260—308 C **32 Claims**

1. A compound selected from the group consisting of compounds of the formula



wherein ring A is unsubstituted or substituted by at least one of halogen, nitro, alkyl of 1–4 carbon atoms, alkoxy of 1–4carbon atoms and trifluoromethyl,

R is hydrogen, alkyl of 1–6 carbon atoms, cyclopentyl or cyclohexyl, said alkyl, cyclopentyl and cyclohexyl groups designated by R being unsubstituted or substituted by at least one of (1) hydroxy, (2) alkoxy of 1–4 carbon atoms, (3) monoalkylamino of 1–3 carbon atoms, (4) dialkylamino of 1–3 carbon atoms in each alkyl group, (5) mercapto, (6) mercapto substituted by alkyl of 1–4 carbon atoms, (7) phenyl, (8) phenyl substituted by at least one of halogen and alkoxy of 1–4 carbon atoms, (9) cyclopropyl, (10) cyclopentyl, (11) cyclohexyl, (12) unsubstituted 1-pyrrolidinyl, (13) unsubstituted morpholino, (14) unsubstituted piperidino, (15) unsubstituted piperazinyl, (16) 4-methylpiperazinyl and (17) 4-hydroxyethylpiperazinyl,

X is oxygen or sulfur, and

Y is $-CH_2-CH_2-$ or $-CH=CH-$,

and pharmaceutically acceptable salts thereof.

4,002,639
2-(SUBSTITUTED PHENYL)-DIBENZ[b,f][1,2,4]TRIAZOLO-[4,3-d][1,4]OXAZEPIN OR THIAZEPIN-3(2H)-ONES

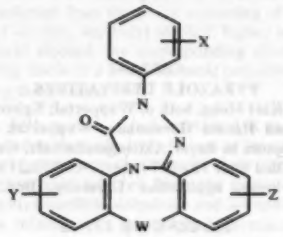
Berthold Richard Vogt, Yardley, Pa., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 31, 1975, Ser. No. 563,769

Int. Cl.² C07D *498/04*, *513/14*

U.S. Cl. 260—308 C **6 Claims**

1. A compound of the formula:



wherein W is O or S; and X, Y and Z are independently selected from the group consisting of hydrogen, bromine, chlorine, fluorine, lower alkyl of 1 to 3 carbon atoms, lower alkoxy of 1 to 3 carbon atoms, and trifluoromethyl.

4,002,640
5(6)-BENZENE RING SUBSTITUTED BENZIMIDAZOLE-2-CARBAMATE DERIVATIVES HAVING ANTHELMINTIC ACTIVITY

Colin C. Beard, Palo Alto; John A. Edwards, Los Altos, and John H. Fried, Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

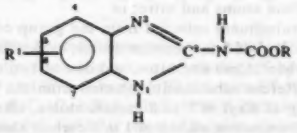
Division of Ser. No. 417,963, Nov. 21, 1973, Pat. No. 3,929,821, which is a continuation-in-part of Ser. No. 319,299, Dec. 29, 1972, abandoned. This application Nov. 3, 1975, Ser. No. 628,434

The portion of the term of this patent subsequent to Dec. 30, 1992, has been disclaimed.

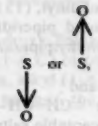
Int. Cl.² C07D *235/32*

U.S. Cl. 260—309.2 **15 Claims**

1. A compound represented by the formula:



where R is a lower alkyl group having 1 to 4 carbon atoms; R^1 is $-SOR^2$, $-SO_2R^2$, -SCN, $-SR^4$, $-OR^5$, or $M'(CH_2)_nMR^7$ where M and M'are independently O, S,



R^7 is lower alkyl having 1 to 4 carbon atoms, phenyl or naphthyl, and n is 1–4; R^2 is lower alkyl having from 1 to 6 carbon atoms, cycloalkyl having 3 to 7 carbon atoms, lower alkenyl or lower alkynyl having 3 to 6 carbon atoms, benzyl, phenethyl, phenyl or naphthyl; and R^5 is lower alkenyl, lower alkynyl, or benzyl or phenethyl; the R^1 substitution being at the 5(6)-position; or a pharmaceutically acceptable salt thereof.

4,002,641

PYRAZOLE DERIVATIVES

Eike Möller; Karl Meng, both of Wuppertal; Egbert Wehinger, Neviges, and Harald Horstmann, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

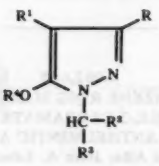
Filed Dec. 13, 1974, Ser. No. 532,311

Claims priority, application Germany, Dec. 20, 1973, 2363511

Int. Cl.² C07D *231/22*

U.S. Cl. 260—310 R **14 Claims**

1. A compound of the formula



or a pharmaceutically acceptable nontoxic salt thereof wherein

R is hydrogen or alkyl of 1 to 4 carbon atoms;

R^1 is hydrogen or alkyl of 1 to 4 carbon atoms;

R^2 is alkyl of 1 to 4 carbon atoms;

R^3 is napthyl; or phenyl substituted by

a. one or two of the same or different substituents selected from the group consisting of halogen, trifluoromethyl, alkyl of 1 to 8 carbon atoms, alkenyl of 2 to 8 carbon atoms, and alkoxy of 1 to 4 carbon atoms;

b. one substituent selected from the group consisting of cycloalkyl of 5 to 7 carbon atoms, cycloalkenyl of 5 to 7 carbon atoms and nitro; or

c. one substituent selected from the group consisting of cycloalkyl of 5 to 7 carbon atoms, cycloalkenyl of 5 to 7 carbon atoms and nitro, and one or two of the same or different substituents selected from the group consisting of alkyl of 1 to 8 carbon atoms, alkenyl of 2 to 8 carbon atoms, alkoxy of 1 to 4 carbon atoms, halogen and trifluoromethyl; and

R^4 is R^5CO wherein R^5 is alkyl of 1 to 4 carbon atoms unsubstituted or substituted by one, two or three halogen moieties.

4,002,642

PROCESS FOR THE PREPARATION OF POLYHALO COPPER PHTHALOCYANINES

Friedrich Ische, Naurod, Taunus, and Ernst Spietschka, Oberauroff, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 15, 1975, Ser. No. 605,060

Claims priority, application Germany, Aug. 17, 1974, 2439600

Int. Cl.² C09B *47/04*

U.S. Cl. 260—314.5 **11 Claims**

1. In a process for the preparation of a polyhalo copper phthalocyanine from a halophthalic acid or a derivative thereof containing no available nitrogen and urea or a derivative of said halophthalic acid containing available nitrogen, a copper salt and a titanium halide, the improvement comprising reacting as a titanium halide an addition compound of a titanium tetrahalide and a compound capable of forming an addition compound with said titanium tetrahalide or, instead of said addition compound, a mixture of its components, said compound capable of forming an addition compound with titanium tetrahalide being selected from the group consisting of thionyl chloride, sulfuryl chloride, phosphorus trichloride, phosphorus oxychloride, phosphorus pentachloride and mixtures thereof.

4,002,643

PREPARATION OF β-ACYL PYRROLES

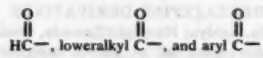
McNeil Laboratories, Incorporated, Norristown, Pa., assignor to McNeil Laboratories, Inc., Fort Washington, Pa.

Filed June 27, 1975, Ser. No. 590,996

Int. Cl.² C07D *207/32*

U.S. Cl. 260—326.5 J **12 Claims**

1. A process for transforming an α-acyl pyrrole having at least one hydrogen atom in the β- position into a β-acyl pyrrole which comprises reacting said α-acyl pyrrole with a strong, anhydrous, non-oxidizing acid, said "acyl" being a member selected from the group consisting of



and said "aryl" being a member selected from the group consisting of phenyl, trifluoromethylphenyl, nitrophenyl and phenyl substituted with from one to three members each selected from the group consisting of loweralkyl, loweralkoxy, and halo, said lower alkyl and lower alkoxy groups having 1 to 5 carbon atoms.

4,002,644

BIS-(1,4-DIHYDRONAPHTHO)[2,3-C; 2,3-F]1,2,5-TRITHIEPANE

David J. Fenoglio, Carol Stream, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 432,996, Jan. 14, 1975, Pat. No. 3,923,753. This application May 19, 1975, Ser. No. 578,620

Int. Cl.² C07D *341/00*

U.S. Cl. 260—327 B **1 Claim**

1. Bis-(1,4-dihydronaphtho)[2,3-c; 2,3-f] 1,2,5-trithiepane.

4,002,645

BIS AROMATIC ANHYDRIDES

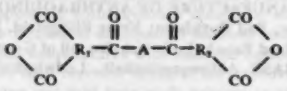
Joseph Sonnenberg, San Jose, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 123,036, March 10, 1971, abandoned. This application May 31, 1974, Ser. No. 475,050

Int. Cl.² C07D *307/89*

U.S. Cl. 260—345.2 **24 Claims**

1. A compound of the formula



wherein R_1 and R_2 are trivalent aromatic radicals having vicinal carbon atoms from which stem the valence bonds to which the anhydride moieties are attached and selected from the group consisting of phenyl and naphthyl and A is a divalent polynuclear aromatic selected from the group consisting of naphthalene anthracene, diphenyl-Z, dinaphthyl-Z, dibenzofuran, fluorene, carbazole, and dibenzothiophene wherein Z is O, S, C_1 to C_3 alkylidene or a single valence bond, the point of attachment to said trivalent aromatic radicals of the carbonyl bridges between said trivalent and divalent aromatic radicals being other than ortho to said vicinal carbon atoms.

4,002,646

PROCESS FOR MAKING TETRAHYDROFURANS

Ivan Maxwell Robinson, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

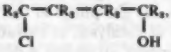
Filed July 17, 1975, Ser. No. 596,647

Int. Cl.² C07D *307/08*

U.S. Cl. 260—346.1 R **9 Claims**

1. A process for making a tetrahydrofuran comprising:

a. contacting gamma-chloroalkanol with a dilute aqueous protonic solution in the liquid phase at a temperature of 50°–200° C by which the alkanol is cyclized to form a tetrahydrofuran and HCl is evolved and absorbed into the protonic solution, the alkanol corresponding to the structure



wherein the R groups are independently selected from the group consisting of hydrogen and alkyl, the sum of carbon atoms in the R groups being no more than 16; and

b. separating the tetrahydrofuran from the reaction mixture.

4,002,647

NOVEL BENZOFURANYL PEST RETARDANTS

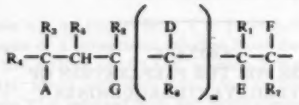
Madhukar Subraya Chodnekar, Seltisberg; Peter Loeliger, Munchenstein; Albert Pfiffner, Bulach; Ulrich Schwieter, Reinach; Milos Suchy, and Rene Zurfluh, both of Pfaffhausen, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

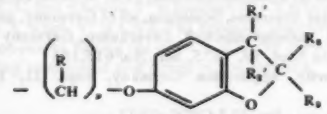
Division of Ser. No. 351,215, April 16, 1973, Pat. No. 3,910,897. This application May 21, 1975, Ser. No. 579,358

Int. Cl.² C07D *307/83*

U.S. Cl. 260—346.2 R **41 Claims**

1. A compound of the formula





wherein R, R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8, R_9, R_1' and r_2' are hydrogen or lower alkyl; A is hydrogen, lower alkyl, lower alkoxy, lower alkenyloxy, or lower alkynyloxy; G and D are individually hydrogen or taken together form a carbon to carbon bond; E and F are individually hydrogen or taken together form a carbon to carbon bond; *m* is an integer of from 0 to 1; and *p* is an integer from 1 to 2.

4,002,648

CATALYZED TRANS-ACIDOLYSIS REACTION OF TRIMELLITIC ACID, TRIMELLITIC ANHYDRIDE AND 2-NAPHTHOIC ACID

Imre Puskas, Glen Ellyn, and Ellis K. Fields, River Forest, both of Ill., assignors to Standard Oil Company, Chicago, Ill.

Continuation-in-part of Ser. No. 379,202, July 16, 1973, abandoned, Division of Ser. No. 63,622, Aug. 13, 1970, Pat. No. 3,784,573. This application Sept. 8, 1975, Ser. No. 611,534

Int. Cl.² C07D *307/89*

U.S. Cl. 260—346.3 **4 Claims**

1. In the method of reacting a lower alkanoic monoester of an alcohol selected from the group consisting of n-butyl alcohol, isobutyl alcohol, sec-butyl alcohol, higher monoalkanols up to n-stearyl alcohol, the corresponding alkenols and the corresponding thiols or a lower alkanoic polyester of a polyalcohol having the formula

$$R-(Y)_n$$

where Y is -OH or -SH, n is 2 to 4, and R is a phenylene radical, a fused carbocyclis with 4 rings or less, a biphenyl, a terphenyl, a bisphenylene or a straight chain aliphatic radical with an organic acid selected from the group consisting of trimellitic acid, trimellitic anhydride and 2-naphthoic acid, as the reaction mixture in a trans-acidolysis reaction, the improvement comprising conducting the reaction in the presence of an effective amount of a basic metal carboxylate catalyst, in the liquid melt phase and in the absence of solvent, said catalyst being a carboxylate of a metal selected from the group consisting of sodium, potassium, calcium and magnesium, the said carboxylate having a K_a less than 10^{-4} and said carboxylate being added to the reaction mixture from an external source.

4,002,649

2-FURALDOXIMINYL ALLOPHANATES

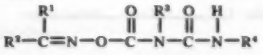
Peter A. Bukowick, Louisiana, Mo., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 350,218, April 11, 1973, Pat. No. 3,957,867. This application Nov. 4, 1975, Ser. No. 628,630

Int. Cl.² C07D *307/54*

U.S. Cl. 260—347.3 **2 Claims**

1. A compound having the following structural formula:



in which when R^1 and R^2 are taken separately, R^1 is selected independently from the group consisting of hydrogen and C_1–C_7 alkyl and R^2 is 2-furanyl; R^3 is selected from the group consisting of C_1–C_7 alkyl, allyl, phenyl, 3-halophenyl and 3,4-dihalophenyl; and R^4 is selected from the group consisting of C_1–C_7 alkyl, allyl, cyclohexyl, phenyl, halophenyl, tolyl, anisolyl, nitrophenyl, 3,4-dihalophenyl, 1-naphthyl, p-toluene sulfonyl, trihalomethylphenyl and 2,6-dinitro-4-trihalomethylphenyl.

4,002,650

PREPARATION OF MALEIC ANHYDRIDE FROM n-BUTANE

Noel J. Bremer, Stow; Ernest C. Milberger, Solon, and Serge R. Dolhyj, Parma, all of Ohio, assignors to The Standard Oil Company (Ohio), Cleveland, Ohio

Filed Dec. 10, 1973, Ser. No. 423,032
Int. Cl.² C07D 307/60
U.S. Cl. 260—346.8 A 1 Claim

1. In the process for the production of maleic anhydride by the oxidation of n-butane with molecular oxygen in the vapor phase at a reaction temperature of 350°–600° C. in the presence of a catalyst of the formula

$V_a P_b U_c O_x$

wherein

a and *b* are 0.5 to 3;

c is 0.1 to 0.5; and

x is the number of oxygens to satisfy the valence requirements of the other elements present.

4,002,651

AZIDO-SILANE COMPOSITIONS

James Glenn Marsden, Amawalk, and Peter Joseph Orenski, Ossining, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed June 26, 1974, Ser. No. 483,367
Int. Cl.² C07C 11/7
U.S. Cl. 260—349 11 Claims

1. A solubilized azido-containing silane composition of matter produced by a process which comprises reacting in the presence of a solvent (a) an azido-containing compound selected from the group consisting of carboxylic acids of the formula

$$(N_3X)_a—Ar—(R)_n—COOH$$

and the ammonium salts of said acids, wherein X is a radical selected from the group consisting of sulfonyl and formyl radicals, *a* is an integer of from 1 to 2, Ar is an aryl or hydroxy-substituted aryl radical, R is an alkylene radical and *n* has a value of 0 or 1; and (b) an amino-containing silane having the formula

$$R'—Si(R^2_b)—Y_{3-b}$$

wherein R^2 is a monovalent hydrocarbon radical, *b* has a value of from 0 to 2, Y is a hydrolyzable group selected from the class consisting of alkoxy and aryloxy radicals, and R′ is an organic radical directly bonded to the silicon atom of said silane through a carbon to silicon bond, said organic radical further containing at least one nitrogen atom, said solvent being present in an amount sufficient to solubilize the azido-containing silane product of (a) and (b).

4,002,652

2-SUBSTITUTED-5,6-DIMETHOXYINDAZOLES

Thomas J. Schwan; Charles S. Davis, both of Norwich, and Leroy J. Honkomp, Oxford, all of N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Division of Ser. No. 472,719, May 23, 1974, Pat. No. 3,966,760. This application Feb. 25, 1976, Ser. No. 661,339
Int. Cl.² C07C 117/00
U.S. Cl. 260—349 1 Claim

1. The compound 6-azidoveratraldehyde.

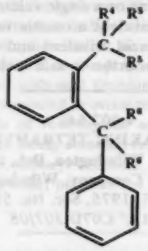
4,002,653

MANUFACTURE OF ANTHRAQUINONE

Peter Reuter, Bad Durkheim; Heinz Ellingsfeld, Frankenthal, and Manfred Patsch, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

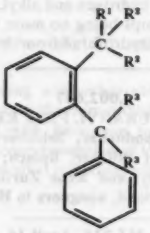
Filed May 22, 1975, Ser. No. 579,886
Claims priority, application Germany, June 26, 1974, 2430567
Int. Cl.² C09B 1/00
U.S. Cl. 260—369 14 Claims

1. In a process for the manufacture of anthraquinone by oxidation of diphenylmethane derivatives of the formula



Ia

where the individual radicals R^4, R^5 and R^6 are identical or different and each is hydrogen or an aliphatic radical, or the two R^5s together and/or the two R^6s together are oxo, and/or R^4 and one R^6 are together an aliphatic radical which is substituted methylene or has at least 2 carbon atoms or, if the R^5s and one R^6, or one R^5 and the two R^6s, or the two R^5s and the two R^6s can, in each case together, be an aliphatic radical, by means of oxygen in the gas phase in the presence of vanadium(V) compounds as catalysts, at elevated temperature, the improvement comprising: oxidizing a diphenylmethane compound of the formula



I

in which the individual radicals R^1, R^2 and R^3 are identical or different and each is hydrogen or an aliphatic radical, in the presence of a catalyst which contains titanium dioxide and vanadium pentoxide in a weight ratio vanadium pentoxide: titanium dioxide of from 0.004:1 to 0.35:1.

4,002,654

PROCESS FOR THE PREPARATION OF DIHYDROXYANTHRAQUINONES

Andreas Huppertz, Cologne-Mulheim; Peter Schultz, Leverkusen, and Dieter Maertens, Schildgen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 19, 1975, Ser. No. 615,101
Claims priority, application Germany, Sept. 21, 1974, 2445221
Int. Cl.² C07C 49/75
U.S. Cl. 260—383 13 Claims

1. In a lime melt process for the preparation of 1,5-dihydroxyanthraquinone and 1,8-dihydroxyanthraquinone and

mixtures thereof from alkali metal or alkaline earth metal salts of the corresponding anthraquinone disulfonic acids wherein said salts are treated in an aqueous medium under pressure and at elevated temperatures with lime and buffer substances to form a lime melt reaction mixture, the improvement comprising carrying out said lime melt process at temperatures from about 290° C to about 370° C and at pressures from about 50 to about 200 bars and subsequently continuously acidifying said reaction mixture with mineral acid to precipitate said dihydroxyanthraquinones.

4,002,655

GLYCYRRHETINIC ACID DERIVATIVES

David William Hawkins, Pinner, England, assignor to Biorex Laboratories, Limited, London, England

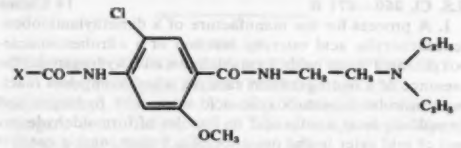
Filed Feb. 10, 1975, Ser. No. 548,767

Claims priority, application United Kingdom, Feb. 8, 1974, 5817/74

Int. Cl.² C07C *103/28*

U.S. Cl. 260—404.5 **6 Claims**

1. A compound selected from the group consisting of compounds of the formula



wherein X is the acyl residue of 18α- or 18β-glycyrrhetinic acid, the 3-hydroxyl group of which is optionally acylated with a monobasic fatty acid containing up to 20 carbon atoms or succinic acid and the metoclopramide salt of said compound wherein the 3-hydroxy group is acylated with succinic acid.

4,002,656

PROCESS FOR THE SELECTIVE OXIDATION OF PARAFFINIC HYDROCARBONS

Jacques Daniel Victor Hanotier, Uccle, and Philippe Jean Andre Charles Camerman, Wesembeek-Oppem, both of Belgium, assignors to Labofina S.A., Brussels, Belgium

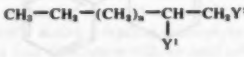
Continuation-in-part of Ser. No. 141,987, May 10, 1971, abandoned. This application May 16, 1975, Ser. No. 578,361

Claims priority, application United Kingdom, May 18, 1970, 23897/70

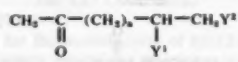
Int. Cl.² C07C *121/14, 121/30;* **C09F** *7/02*

U.S. Cl. 260—406 **17 Claims**

1. A process for the oxidation of aliphatic compounds of the formula:



wherein *n* is an integer from 1 to 16 inclusive, wherein Y^1 is hydrogen or a substituent selected from the group consisting of X, CN, COOR and OCOR, wherein X is a halogen and R is an alkyl radical containing from 1 to 6 carbon atoms inclusive, wherein Y^2 is selected from the group consisting of Y^1, CHX_2 and CX_3 and wherein Y^1 is hydrogen or X when Y^2 is CX_3 and Y^1 is X when Y^2 is CHX_2, to produce selective formation of monoketones having the same number of carbon atoms as the starting compound and being of the formula:



wherein *n*, Y^1 and Y^2 are as defined above, the process comprising contacting a feed consisting essentially of said aliphatic compounds in the liquid phase with a catalyst wherein the active agent in said catalyst consists essentially of a mixture of divalent and trivalent cobalt ions having a combined concentration of from 0.05 mole per liter of reaction mixture to the saturation level of the reaction mixture, at a temperature between 30° and 100° C., in the presence of molecular oxygen and in the absence of an activator, said mixture of divalent and trivalent cobalt ions having a Co(III)/Co(III) + Co(II) ratio of between 0.8 and 1.0.

4,002,657

PERFLUOROALKYLALKYLCARBOXYLIC ACIDS, PROCESS FOR THEIR MANUFACTURE AND THEIR USE

Horst Jäger, Bettingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 15, 1974, Ser. No. 442,953

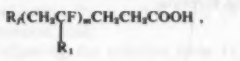
Claims priority, application Switzerland, Mar. 5, 1973, 3184/73

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C07C *53/34;* **D06M** *13/20*

U.S. Cl. 260—408 **6 Claims**

1. A perfluoroalkylalkylcarboxylic acid of the formula



wherein R_f is an unbranched or branched perfluoroalkyl radical with 3 to 18 carbon atoms, R_1 is hydrogen or fluorine, and *m* is a whole number from 1 to 3.

4,002,658

METHANATION CATALYST AND PROCESS OF USING THE SAME

Ralph A. Dalla Betta, Dearborn; Ann G. Piken, West Bloomfield, and Mordecai Shelef, Southfield, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed May 1, 1975, Ser. No. 573,716

Int. Cl.² C07C *1/04;* **B01J** *23/74*

U.S. Cl. 260—449 M **2 Claims**

1. A method of methanating a synthesis gas stream including a sulfur bearing component in a concentration in a range from 10 ppm to 100 ppm which comprises: passing said synthesis gas stream over a nickel catalyst formed on a catalyst substrate principally of zirconium oxide.

4,002,659

ETHYL 2′,5′-DICHLORO-4′-THIOCYANATOFUMARANILATE

Stanford S. Pelosi, Jr., Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Jan. 16, 1976, Ser. No. 649,584

Int. Cl.² C07C *161/02*

U.S. Cl. 260—454 **1 Claim**

1. The compound ethyl 2′,5′-dichloro-4′-thiocyanatofumaranilate.

4,002,660

S-(4-CHLOROPHENYL)-3-ARYL-3-HYDROXYPROPANE-THIOATES

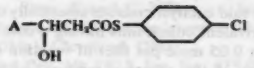
Harry R. Snyder, Jr., Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Mar. 8, 1976, Ser. No. 664,868

Int. Cl.² C07C *153/07*

U.S. Cl. 260—455 R **8 Claims**

1. A compound of the formula:



wherein A is phenyl, 4-methylphenyl, 4-ethylphenyl, 4-chlorophenyl, 2,4-dichlorophenyl, 3,4-dichlorophenyl or 3-chloro-4-methylphenyl.

4,002,661

PERFLUOROALKANESULFONATE ESTERS

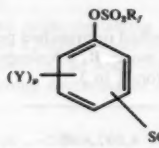
Tomas L. Fridinger, Village of Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 575,648, May 8, 1975, Pat. No. 3,954,828, which is a division of Ser. No. 336,956, March 1, 1973, Pat. No. 3,907,853, which is a continuation-in-part of Ser. No. 27,998, April 13, 1970, abandoned. This application Jan. 26, 1976, Ser. No. 652,403

Int. Cl.² C07C *143/68*

U.S. Cl. 260—456 R **3 Claims**

1. The compound of the formula:



wherein R_f is CF_3 or C_2F_5, each Y independently is chlorine or an alkyl group having 1 or 2 carbon atoms and *p* is an integer from zero, 1 or 2.

4,002,662

2-NITRO-5-(CYANO-TRIFLUOROMETHYL-PHENOXY)-BENZOIC ACIDS AND ESTERS

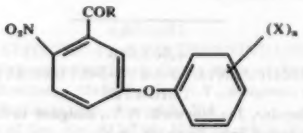
Robert J. Theissen, Westfield, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 398,610, Sept. 19, 1973, Pat. No. 3,941,830, which is a continuation of Ser. No. 114,712, Feb. 11, 1971, Pat. No. 3,784,635, which is a continuation-in-part of Ser. No. 819,412, April 25, 1969, Pat. No. 3,652,645. This application Jan. 29, 1975, Ser. No. 545,232

Int. Cl.² C07C *121/75*

U.S. Cl. 260—465 D **2 Claims**

1. A compound having the formula:



wherein R is hydroxy or alkoxy of 1 to 5 carbon atoms, *n* is an integer of 2, and in which compound one X is trifluoromethyl and one other X is cyano.

4,002,663

DEUTERATED PROSTAGLANDIN ANALOGS

Masateru Miyano, Northbrook, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed Mar. 3, 1975, Ser. No. 554,965

Int. Cl.² C07C *177/00*

U.S. Cl. 260—468 D **3 Claims**

2. A compound which is 9β,15β-bisdeuterio-9α,11α,15α-trihydroxy-5-cis,13-trans-prostadienoic acid.

3. A compound which is 15β-deuterio-9β,11α,15α-trihydroxy-5-cis,13-trans-prostadienoic acid.

4,002,664

MANUFACTURE OF DIMETHYLAMINOBENZENECARBOXYLIC ACID ESTERS

Hans-Juergen Quadbeck-Seeger, and Helmut Hoch, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed June 5, 1974, Ser. No. 476,394

Claims priority, application Germany, June 9, 1973, 2329553; Feb. 15, 1974, 2407160

Int. Cl.² C07C *99/00*

U.S. Cl. 260—471 R **14 Claims**

1. A process for the manufacture of a dimethylaminobenzenecarboxylic acid ester by reaction of a nitrobenzenecarboxylic acid ester with formaldehyde and hydrogen in the presence of a hydrogenation catalyst, which comprises reacting a nitrobenzenecarboxylic acid ester with hydrogen and formaldehyde at a ratio of 2 to 8 moles of formaldehyde per mol of said ester in the presence of a hydrogenation catalyst which contains one or more metals of atomic numbers from 24 to 29, and in the presence of a weak organic acid, at a temperature in the range of 35° to 150° C and at a pressure of at least 40 atmospheres.

4,002,665

PROCESS FOR SUBSTITUTED CYCLOHEXENES AND ITS PRODUCTS

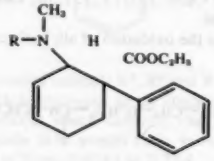
Gerhard Satzinger, Gundelfingen, and Gustav Hechtfischer, Freiburg-Landwasser, both of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 117,142, Feb. 19, 1971, Pat. No. 3,792,080. This application Aug. 14, 1973, Ser. No. 388,285

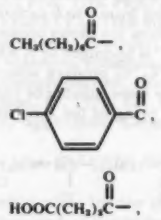
Int. Cl.² C07C *101/14*

U.S. Cl. 260—471 A **11 Claims**

1. A compound of the formula:



wherein R is selected from the group consisting of



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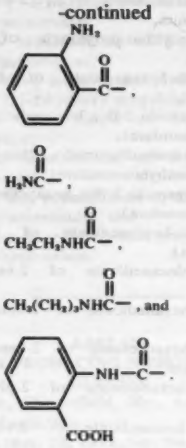


4,002,666

PROCESS FOR THE PREPARATION OF OPTICALLY ACTIVE p-HYDROXYPHENYLGLYCINE

Tadashi Shirai, Musashino; Yasuhisa Tashiro, Yokohama, and Shigeru Aoki, Tokyo, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

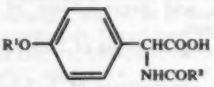
Filed Oct. 22, 1974, Ser. No. 516,963

Claims priority, application Japan, Oct. 23, 1973, 48-118542

Int. Cl.² C07C *19/00, 103/46, 103/84, 125/06*

U.S. Cl. 260—471 C 10 Claims

1. A process for the preparation of optically active p-hydroxyphenylglycine, which comprises reacting a racemic compound of a p-hydroxyphenylglycine derivative represented by the following general formula



(wherein R^1 represents a hydrogen atom, a lower alkyl group or an acyl group and R^2 represents a hydrogen atom, a lower alkyl group, a phenyl group or a benzyloxy group) with optically active α-phenylethylamine in a solvent to form a corresponding salt, subjecting said salt to fractional crystallization for optical resolution to obtain two kinds of optically active salts, decomposing at least one of said two kinds of optically active salts by means of an acid or an alkali to obtain the respective optically active p-hydroxyphenylglycine derivative, and hydrolyzing said derivative with an acid selected from the group consisting of hydrochloric acid, sulfuric acid, hydrobromic acid and hydroidic acid.

4,002,667

BIS-(2-HYDROXYETHYL)-TEREPHTHALATE

John Martin Thompson, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Mar. 17, 1975, Ser. No. 558,694

Claims priority, application United Kingdom, Mar. 26, 1974, 13277/74

Int. Cl.² C07C *69/82*

U.S. Cl. 260—475 P 7 Claims

1. A process for the manufacture of bis-(2-hydroxyethyl)-terephthalate, which comprises heating together dimethyl terephthalate and ethylene glycol, the molar ratio of ethylene glycol to dimethyl terephthalate being at least 8:1, under distillation conditions at a pressure of from 15 mm to 100 mms Hg in the presence of a basic catalyst, said basic catalyst being an alkali or alkaline earth metal or an oxide, hydroxide, stable bicarbonate, carbonate or alcoholate thereof or a quaternary ammonium hydroxide or a dialkali hydrogen phosphate, in excess over that required to neutralize any acidity in the dimethyl terephthalate or ethylene glycol.

4,002,668

METHOD OF PRODUCING ANHYDROUS CRYSTALLINE REACTION PRODUCTS OF FORMALDEHYDE AND METHYL-, ETHYL CARBAMATE

Norton A. Cashen, Metairie, La., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 16, 1975, Ser. No. 578,298

Int. Cl.² C07C *125/06*

U.S. Cl. 260—482 C 2 Claims

1. A process for preparing in the crystalline state, dimethylol methyl carbamate, the process which comprises:

a. admixing an aqueous reaction mixture of paraformaldehyde and methyl carbamate in a molar ratio to 2.2 to 1.0, to give a total solids content of 25–50%, and sufficient basic catalyst to maintain a pH of 10.1;

b. allowing the solution from (a) to stand for 30 minutes to 24 hours at temperatures varying from ambient to 65° C;

c. adjusting the solution from (b) to a pH of 5.5 with a mineral acid;

d. adjusting the solution from (c) with water to a solids concentration no greater than ten weight percent;

e. lyophilizing the frozen solution from (d) for about twenty-four hours;

f. diluting the lyophilized product from (e) with water to ten percent solids, and lyophilizing the diluted product;

g. reducing the temperature of the partially crystalline residue of (f) to about 18° C.

4,002,669

HYDROXY GROUP CONTAINING DIESTERS OF ACRYLIC ACID

Albert Gross, Frankfurt am Main, and Roland Schaefer, Friedrichsdorf, Taunus, both of Germany, assignors to Kulzer & Co. GmbH, Bad Homberg vor der Hohe, Germany

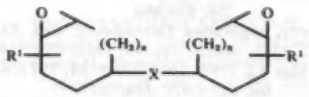
Filed Jan. 27, 1975, Ser. No. 544,532

Claims priority, application Germany, Feb. 12, 1974, 2406557

Int. Cl.² C07C *69/54*

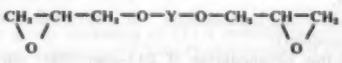
U.S. Cl. 260—486 B 8 Claims

1. Polymerizable hydroxy-group-containing diesters of acrylic acids prepared by the reacting 3-(3,4-epoxycyclohexyl)-8,9-epoxy-2,4-dioxaspiro(5,5)undecane or a bis-epoxide of formula (A)



(A)

or a bis-epoxide of formula (B)



(B)

with a hydroxyalkylacrylate or hydroxyalkylmethacrylate containing 2 to 10 carbon atoms in the alkyl portion, *n* being 0 or 1 in formula (A) with the proviso that if

n is 0,

X is —O— and

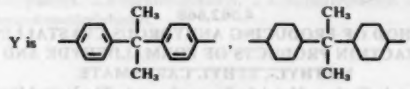
R^1 is —H; and that if

n is 1,

X is selected from the group of alkylene with 1 to 10 carbon atoms, C_{1-5}-alkyl substituted alkylene with 1 to 10 carbon atoms, $-O-(CH_2)_m-O-$ where *m* is 1 to 10, $-CH_2-OCO-(CH_2)_p-COO-CH_2$ where *p* is 1 to 6, and $-CH_2-OCO-$, and

R^1 is $-H$ or $-CH_3$,

and in formula (B)

Y is 

or tricyclo-[5.2.1.$0^{2,6}$]-decylene.

4,002,670

NEMATIC COMPOUNDS AND MIXTURES

Ralf Steinstrasser, Darmstadt, Germany, assignor to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

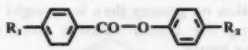
Filed Aug. 3, 1972, Ser. No. 277,502

Claims priority, application Germany, Aug. 7, 1971, 2139628

Int. Cl.² C07C *69/76*

U.S. Cl. 260—473 R **16 Claims**

1. A compound of the formula



wherein R_1 is straight chain alkyl and R_2 is straight chain alkoxy, or vice versa, and selected from the group consisting of 4′-pentoxyphenyl ester of 4-propylbenzoic acid, 4′-hexoxyphenyl and 4′-heptoxyphenyl esters of 4-butylbenzoic acid, 4′-pentoxyphenyl ester of 4-pentylbenzoic acid, 4′-butoxyphenyl, 4′-pentoxyphenyl, 4′-hexoxyphenyl and 4′-heptoxyphenyl esters of 4-hexylbenzoic acid, 4′-pentylphenyl ester of anisic acid, 4′-butylphenyl and 4′-pentylphenyl esters of 4-pentoxybenzoic acid, and 4′-propylphenyl, 4′-butylphenyl, 4′-pentylphenyl and 4′-hexylphenyl esters of 4-hexoxybenzoic acid.

4,002,671

SUBSTITUTED ALKYL, ARYL, ARALKYL THIO ALKANAMINE ADDITION SALTS

Gregoire Kalopissis, Paris, France, assignor to Societe Anonyme dite: L'Oreal, Paris, France

Division of Ser. No. 203,038, Nov. 29, 1971, Pat. No. 3,879,560, which is a continuation-in-part of Ser. No. 801,840, Feb. 24, 1969, abandoned. This application Dec. 20, 1974, Ser. No. 534,804

Claims priority, application Luxembourg, Feb. 23, 1968, 55553; Dec. 22, 1965, 50125; Apr. 19, 1968, 55935; Feb. 19, 1969, 58042; May 12, 1969, 58634; Oct. 28, 1971, 64174

Int. Cl.² C07C *149/243*

U.S. Cl. 260—501.12 **2 Claims**

1. A compound selected from the group consisting of:

5-amino-3-thia hexanedioate of 2-benzylthio-ethylammonium,

5-acetamido-3-thia-hexanedioate of di-(2-benzyl-thioethylammonium),

5-amino-3-thia hexanedioate of 2-(3-alanylthio) ethylammonium,

5-amino-3-thia hexanedioate of 2-methylthioethylammonium,

5-amino-3-thia hexanedioate of 3-benzylthiopropylammonium,

2-amino-4-thia heptanedioate of 2-benzylthioethylammonium,

5-amino-3-thia hexanedioate of 2-(2,2-dimethoxyethylthio)-ethylammonium,

2-acetamido-3-benzylthio-propionate of 2-methylthioethylammonium,

5-benzamido-3-thia-hexanedioate of di-(2-benzylthioethylammonium),

5-p-toluenesulfonamido-3-thia-hexanedioate of di-(2-benzylthioethylammonium),

5-p-acetamidobenzenesulfonamido-3-thia-hexanedioate of di-(2-benzylthioethylammonium),

5-p-acetamidobenzamido-3-thia-hexanedioate of di-(2-benzylthioethylammonium),

2-acetamido-4-thia-heptanedioate of di-(2-methylthioethylammonium),

2-amino-4-thia decanedioate of 2-benzylthioethylammonium,

5-amino-3-thia hexanedioate of 2-benzylthiopropylammonium,

5-amino-3-thia hexanedioate of 2-benzylthio-2-methylpropylammonium,

5-amino-3-thia hexanedioate of 2-phenylthioethylammonium,

5-amino-3-thia hexanedioate of 2-t-butylthioethylammonium,

5-amino-3-thia hexanedioate of 2-tritylthioethylammonium,

5-amino-3-thia hexanedioate of 2-(2-butenylthio) ethylammonium,

5-amino-3-thia hexanedioate of 2-(2-hydroxyethylthio)-ethylammonium,

5-amino-3-thia hexanedioate of 2-(2,3-dihydroxypropylthio) ethylammonium,

3-benzylthio-2-phenylacetamido propionate of 2-methylthioethylammonium,

2-acetamido-3-tritylthiopropionate of 2-methylthioethylammonium,

2-acetamido-3-benzhydrylthio propionate of 2-methylthioethylammonium,

5-amino-3-thia hexanedioate of 6-methanesulfonamido-6-ethoxy carbonyl-4-thia hexylammonium,

2-acetamido-4-thia-nonanedioate of 2,2′-thio bis (ethylammonium),

di-(β-benzylthioethylammonium) 5-p-acetamido-3-thia-hexanedioate,

5-amino-3-thia acid hexandedioate of 2-octadecylthio ethylammonium,

2-amino-4-thia heptanedioate of 2-undecenylthio ethylammonium,

2-amino-4-thia nonanedioate of 2-(3-hydroxypropylthio) ethylammonium.

di-(5-amino-3-thia hexanedioate) of 3-thia-1,6-hexanediammonium,

2-amino-4-thia octanedioate of 2-(β-ureido ethylthio)-ethylammonium,

5-amino-3-thia hexanedioate of 2-(3-methanesulfonamido propylthio) ethylammonium,

5-amino-3-thia hexanedioate of 2-(p-phenylbenzylthio) ethylammonium,

5-tetradecanamido-3-thia hexanedioate of di(2-β-hydroxyethyl thio ethylammonium),

2-crotonamido-4-thia heptanedioate of di(2-tertiobutylthio ethylammonium),

2-butanesulfonamido-4-thia octanedioate of 2,2′-(2,3-dihydroxy-1,4-butanediyl dithio) diethylammonium,

2-formamido-3-(propyn-2-ylthio) propionate of 3-(1-naphthyl thio) propylammonium,

3-methylthio-2-trifluoroacetamido propionate of 2-oleylthio ethylammonium,

2-o-chlorobenzylthiomethyl-3-aza-4-oxo heptanedioate of 5,5′-sulfonyl bis (3-thia pentylammonium),

2-acetamido-3-p-methylthiophenylthio propionate of 2-(2,4,6-trimethyl benzylthio) ethylammonium,

5-amino-3-thia hexanedioate of 2-(3,4-dichlorobenzylthio) ethylammonium,

2-butyramido-3-isopropylthio propionate of 2-(2,6-dichloro benzylthio) ethylammonium,

2-acetamido-3-(3-alanylthio) propionate of 2-m-fluorobenzylthio ethylammonium,
6-amino-3-thia heptanedioate of 2-p-dimethylaminobenzylthio ethylammonium,
2-hexanamido-di-(p-methoxyphenyl)-3-methylthio propionate of 2-(2,3-dihydroxy propylthio) ethylammonium,
5-amino-3-thia hexanedioate of 2-(o-chlorobenzylthio) ethylammonium,
5-amino-3-thia hexanedioate of 2-(p-bromobenzylthio) ethylammonium,
5-acetamido-3-thia hexanedioate of di-2-(2,4-dichlorobenzylthio) ethylammonium, and
2-acetamido-3-p-fluorobenzylthio propionate of 2-hexadecylthio ethylammonium.

4,002,672
PROCESS FOR PRODUCING N-PHOSPHONOMETHYL GLYCINE

Lowell R. Smith, Chesterfield, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Mar. 22, 1972, Ser. No. 236,769
Int. Cl.² C07F 9/38
U.S. Cl. 260—502.5 **14 Claims**

1. A process for the production of N-phosphonomethyl glycine which comprises forming an admixture consisting essentially of N-phosphonomethylimino diacetic acid and an acid selected from the group consisting of from 60% sulfuric acid to 20% fuming sulfuric acid, 47% hydrobromic acid, concentrated hydrochloric acid and hydriodic acid and heating said admixture to a temperature of from about 70° to about 200° C. whereby said N-phosphonomethylimino diacetic acid is decomposed to produce said N-phosphonomethyl glycine.

4,002,673
PROCESS FOR THE PREPARATION OF UNSATURATED AMINO COMPOUNDS

Rudolf Braden, Odenthal-Scheuren; Hans Knupfer, Schlidgen, and Sigurd Hartung, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 12, 1974, Ser. No. 532,184
Claims priority, application Germany, May 28, 1974, 2425811
Int. Cl.² C07C 143/56, 85/11
U.S. Cl. 260—510 **7 Claims**

1. Process for the preparation of an aromatic amine which contains an olefinic double bond which comprises hydrogenating an aromatic nitro compound containing an olefinic double bond in the presence of a catalyst consisting essentially of a metal sulphide of the formula

MeS_x

in which

x is a number from 1 to 4 and

Me is iron, nickel, ruthenium, rhodium, palladium, rhenium, osmium, iridium or platinum at 20° to 140° C and at 5 to 150 bars hydrogen pressure.

4,002,674
4-HOMOISOTWISTANE-3-CARBOXYLIC ACID

Yoshiaki Inamoto; Hiroshi Ikeda; Naotake Takaishi, all of Wakayama, and Kiyoshi Tsuchihashi, Kainan, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed July 14, 1975, Ser. No. 595,556
Claims priority, application Japan, July 16, 1974, 49-81535
Int. Cl.² C07C 61/12
U.S. Cl. 260—514 G **1 Claim**

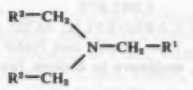
1. 4-homoisotwistane-3-carboxylic acid.

4,002,675
MANUFACTURE OF 2-HYDROXY-NAPHTHALENE-3-CARBOXYLIC ACID

Hans-Juergen Quadbeck-Seeger, Ludwigshafen, and Helmut Hoch, Wachenheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

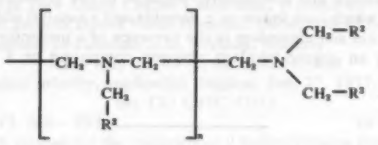
Filed Feb. 6, 1975, Ser. No. 547,641
Claims priority, application Germany, Feb. 15, 1974, 2407114
Int. Cl.² C07C 51/15
U.S. Cl. 260—520 A **7 Claims**

1. A process for the manufacture of 2-hydroxy-naphthalene-3-carboxylic acid by reaction sodium β-naphtholate with carbon dioxide at elevated temperatures, which comprises heating sodium β-naphtholate or a mixture of sodium β-naphtholate and potassium β-naphtholate in a first stage, in the presence of a catalytic amount of inhibitor selected from the group consisting of nitrogen compounds of the formula



I

and polyphosphates containing at least 3 phosphorus atoms per molecule, wherein R^1 is carboxyl, metal carboxylate or the radical



the radicals R^2 are identical or different and each is carboxyl, metal carboxylate or the radical $-CH_2OH$, n is 0, 1 or 2, to a temperature of at least 180° C and reacting, in a second stage, said first stage reaction mixture with carbon dioxide at the above temperature, and the resulting salt of 2-hydroxy-naphthalene-3-carboxylic acid is then converted to 2-hydroxy-naphthalene-3-carboxylic acid by addition of an acid.

4,002,676
HYDROXYETHERCARBOXYLIC ACIDS

Gerhard Borggrefe, Dusseldorf, Germany, assignor to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

Filed Jan. 28, 1972, Ser. No. 221,816
Claims priority, application Germany, Aug. 23, 1971, 2142207
Int. Cl.² C07C 59/14, 59/12
U.S. Cl. 260—535 P **8 Claims**

1. A hydroxyethercarboxylic acid compound selected from the group consisting of (1) a compound selected from the group consisting of 1,2-bis-O-carboxymethyl glycerine, mono-O-carboxymethyl glyceric acid, mono-O-carboxymethyl tartaric acid, mono-O-carboxymethyl erythric acid, mono-O-carboxymethyl-1,2,3-trihydroxyglutaric acid, and 1,2-bis-O-carboxymethyl-1,2,3-trihydroxyglutaric acid; and (2) a salt of said compound selected from the group consisting of alkali metal salts, ammonium salts, lower alkylamine salts, and lower akylolamine salts.

4,002,677
PROCESS FOR PREPARING CARBOXYLIC ACID ANHYDRIDES

Anthony N. Naglieri, Pine Brook, and Nabil Rizkalla, River Vale, both of N.J., assignors to Halcon International, Inc., New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,813
Int. Cl.² C07C 51/54, 51/56
U.S. Cl. 260—549 **4 Claims**

1. A process for the preparation of an anhydride of a monocarboxylic acid which comprises reacting carbon monoxide and an alkyl or aryl carboxylic acid ester or an alkyl or aryl ether under substantially anhydrous conditions at elevated temperature and superatmospheric pressure in the presence of a halide which is an iodide or a bromide and a catalyst comprising nickel and chromium and in the presence of a tin promoter.

4,002,678
PREPARATION OF CARBOXYLIC ACID ANHYDRIDES

Anthony N. Naglieri, Pine Brook, and Nabil Rizkalla, River Vale, both of N.J., assignors to Halcon International, Inc., New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,208
Int. Cl.² C07C 51/54, 51/56
U.S. Cl. 260—549 **6 Claims**

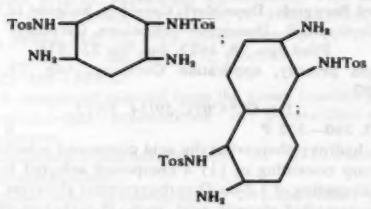
1. A process for the preparation of an anhydride of a monocarboxylic acid which comprises reacting carbon monoxide and an alkyl or aryl carboxylic acid ester or an alkyl or aryl ether under substantially anhydrous conditions at elevated temperature and atmospheric pressure in the presence of a halide which is an iodide or a bromide and a catalyst comprising nickel and chromium in the presence of a promoter comprising an organo-trivalent nitrogen compound or a phosphine.

4,002,679
PREPARATION OF POLYBENZIMIDAZOLES

Fred E. Arnold, Centerville, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Division of Ser. No. 495,452, Aug. 7, 1974, Pat. No. 3,901,855. This application Mar. 27, 1975, Ser. No. 563,007
Int. Cl.² C07C 143/75, 143/77, 143/79
U.S. Cl. 260—556 A **3 Claims**

1. As a new composition of matter, a compound selected from the group of compounds having the following formulas:



where Tos represents RSO_3, with R being phenyl, tolyl, xylyl, naphthyl, diphenyl, methylnaphthyl, benzyl, chlorophenyl, chlorodiphenyl, methyl, ethyl, propyl, amyl, octyl, decyl, dodecyl, octadecyl, cyclohexyl, cycloheptyl, methylcyclohexyl, or ethylcycloheptyl.

4,002,680
PROCESS FOR THE MANUFACTURE OF ACYLHYDRAZINES

Heimo Brunetti; Andreas Schmidt, both of Reinach, and Siegfried Rosenberger, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 17, 1973, Ser. No. 361,352
Claims priority, application Switzerland, May 31, 1972, 8031/72
Int. Cl.² C07C 103/20
U.S. Cl. 260—559 H **13 Claims**

1. A process for the manufacture of 1,2-diacylhydrzaines of the formula I*a*

$$R_1—CO—NH—NH—CO—R_3 \quad \text{(Ia)}$$

wherein R_1 and R_3 independently of one another are an aliphatic, cycloaliphatic, araliphatic, or aromatic radical, in which process 1 equivalent of an acyl hydrazide of the formula II

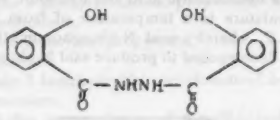
$$R_1—CO—NH—NH_2 \quad \text{II}$$

and approximately one equivalent of a carboxylic acid of the formula III

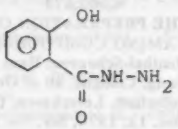
$$R_2 — COOH \quad \text{(III)}$$

are reacted with approximately one equivalent of thionyl chloride at a temperature of 50° to 180° C and in the presence of a catalyst selected from pyridine and dimethylformamide, provided that said catalyst may be omitted if the reaction is carried out in the solvent dimethylacetamide.

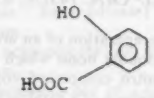
7. Process according to Claim 1 for the manufacture of



wherein 1 equivalent of



and approximately one equivalent of



are reacted with approximately one equivalent of thionyl chloride, *in chlorobenzene and in the presence of a catalyst selected from pyridine and dimethylformamide.*

8. A process for the manufacture of 1,2-diacylhydrazines of the formula Ic

$$R_1—CO—NHNH—Y—NHNH—CO—R_1 \quad \text{(Ic)}$$

wherein R_1 is an aliphatic, cycloaliphatic, araliphatic, or aromatic radical, and Y is the diacyl radical of a divalent aliphatic, araliphatic, aromatic or heterocyclic dicarboxylic acid, in which process two equivalents of an acyl hydrazide of the formula II

$$R_1—CO—NH—NH_2 \quad \text{(II)}$$

and approximately one equivalent of a compound of the formula VI,'

$$HO—Y—OH \quad \text{(VI)}$$

are reacted with approximately two equivalents of thionyl chloride at a temperature of 50° to 180° C and in the presence

of a catalyst selected from pyridine and dimethylformamide, provided that said catalyst may be omitted if the reaction is carried out in the solvent dimethylacetamide.

4,002,681

BIS-GUANIDINIUM DECAHYDRODECABORATE AND A PROCESS FOR ITS PREPARATION

Terrence P. Goddard, Aptos, Calif., assignor to Teledyne McCormick Selph, an operating division of Teledyne Industries, Inc., Hollister, Calif.

Filed June 10, 1976, Ser. No. 694,627
Int. Cl.² C07C *129/00*
U.S. Cl. 260—564 D 1 Claim

1. The bis-guanidinium salt of decahydrodecaboric acid, having the formula $(C(NH_2)_3)_2B_{10}H_{10}$.

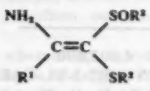
4,002,682

AROMATIC ENAMINOSULFOXIDE DERIVATIVES

Genichi Tsuchihashi, Tama, and Katsuyuki Ogura, Sagamihara, both of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan

Division of Ser. No. 396,366, Sept. 12, 1973, Pat. No. 3,898,785. This application Mar. 6, 1975, Ser. No. 555,993
Claims priority, application Japan, Sept. 12, 1972, 47-90948; Sept. 12, 1972, 47-90949; Sept. 12, 1972, 47-90952; Oct. 18, 1972, 47-103606
Int. Cl.² C07C *149/42*, *149/24*
U.S. Cl. 260—570.5 S 10 Claims

1. An enaminosulfoxide of the formula,



(I)

in which R^1 is alkyl, dialkoxyalkyl, phenylalkyl, phenyl, chlorophenyl, alkylphenyl, alkoxyphenyl or dialkoxyphenyl, said alkyl and alkoxy each containing 1 to 4 carbon atoms, and each R^2 is independently alkyl of 1 to 4 carbon atoms, phenyl, tolyl or chlorophenyl, wherein at least one of the R^1 and R^2 is aromatic.

4,002,683

PROCESS FOR ISOMERIZING ALPHA ACIDS TO ISO-ALPHA ACIDS

Paul H. Todd, Jr., Kalamazoo, Mich., assignor to Kalsec, Inc., Kalamazoo, Mich.

Continuation-in-part of Ser. No. 139,849, May 3, 1971, abandoned. This application Jan. 10, 1972, Ser. No. 216,757
Int. Cl.² C07C *45/00*
U.S. Cl. 260—586 D 21 Claims

1. In a process for transforming an alpha acid into an iso-alpha acid involving contact of the alpha acid with an aqueous solution of a metal salt, the improvement which comprises employing a water-immiscible organic solvent, employing sufficient metal salt to drive or maintain the alpha acid into or in the water-immiscible organic solvent, the pH being maintained at 13 or below, and effecting the desired isomerization in the water-immiscible organic solvent.

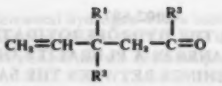
4,002,684

MANUFACTURE OF γ,δ-UNSATURATED KETONES

Karl von Fraunberg, Bobenheim, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed June 26, 1975, Ser. No. 590,405
Claims priority, application Germany, July 5, 1974, 2432232
Int. Cl.² C07C *45/00*
U.S. Cl. 260—593 R 8 Claims

1. A process for the manufacture of γ,δ-unsaturated ketones of the general formula II

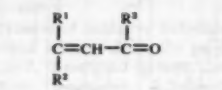


(II),

in which R^1 and R^2 are alkyl of from 1 to 4 carbon atoms and R^3 is an aliphatic or cycloaliphatic hydrocarbon radical which contains up to 8 carbon atoms and which may contain one or more C—C double bonds in other than the α,β-position to the carbonyl group which comprises reacting a vinylmagnesium halide of formula IV

(IV),

in which X is Cl, Br or I, at −80° C to 0° C in an aprotic solvent with ketone of the general formula III



(III),

in which R^1, R^2 and R^3 have the meanings stated above, in the presence of a catalytic amount of a copper compound selected from the group consisting of CuCl, CuBr, CuI, CuCN, Cu_2O, CuSCN, CU_2SO_4, $CuCl_2$ $CuBr_2$, $CuSO_4$, $Cu(OCOCH_3)_2$, $Cu(NO_3)_2$, $Cu(OH)_2$, CuO, $Cu(CNS)_2$, copper acetonyl acetonate, $(CuCOX_3)_2$ and $(CuXPR_3)_4$, in which X denotes Cl, Br or I and R is alkyl, aryl or alkoxy.

4,002,685

PROCESS FOR THE OXIDATION OF SECONDARY ALCOHOLS INTO KETONES

Philippe Jean Andre Charles Camerman, Wesembeek-Oppem, and Jacques Daniel Victor Hanotier, Uccle, both of Belgium, assignors to Labofina S.A., Brussels, Belgium

Filed May 10, 1971, Ser. No. 141,988
Claims priority, application Belgium, Jan. 27, 1971, 95993
Int. Cl.² C07C *45/16*
U.S. Cl. 260—593 R 10 Claims

1. A process for the oxidation of 2-hydroxyalkane present in a mixture of aliphatic secondary alcohols having no tertiary hydrogen on a carbon atom in alpha position relative to the carbon atom linked to the hydroxyl group, to produce a reaction product containing at least about 80 mole % of ketones having the same number of carbon atoms and having a higher proportion of methyl ketone than the proportion of 2-hydroxyalkane in said mixture, said process comprising contacting said mixture of alcohols in the liquid phase with a cobalt salt of a lower fatty acid having a trivalent cobalt to total cobalt ratio of between 0.5 and 1, the concentration of said cobalt salt being at least 0.05 mole per liter of reaction mixture, at a temperature between 20° and 120° C. and limiting the conversion of said alcohols to at most 50%.

4,002,686

METHOD OF PREPARING PRIMARY ALIPHATIC MERCAPTANS

Kirk Emerson Davis, Euclid, and Emil Thomas Wierber, Mayfield Village, both of Ohio, assignors to The Lubrizol Corporation, Cleveland, Ohio

Filed Aug. 5, 1975, Ser. No. 602,037
Int. Cl.² C07C *149/08*, *148/00*
U.S. Cl. 260—609 R 13 Claims

1. A method for preparing mercaptans of the formula RSH which comprises heating a composition consisting essentially of at least one of (1) a mixture of a phosphorodithioic acid having the formula $(RO)_2PSSH$, wherein each R is individually an aliphatic radical with at least one R being a primary radical, and a basic nitrogen compound, and (2) a salt of said basic nitrogen compound and said phosphorodithioic acid, at a temperature sufficient to result in formation of said mercaptan.

4,002,687

PROCESS FOR THE HYDROPEROXIDATION OF BRANCHED ALKANES IN A PLURALITY OF STAGES, COMPRISING WASHINGS BETWEEN THE SAID STAGES

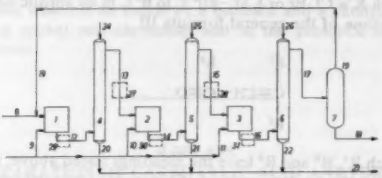
Jean Merle D'Aubigne, Paris; Jean Maurin, Montivilliers, and Joseph Edouard Weisang, Le Havre, all of France, assignors to Compagnie Francaise de Raffinage, Paris, France

Continuation of Ser. No. 407,475, Oct. 18, 1973, abandoned. This application July 2, 1975, Ser. No. 592,770

Claims priority, application France, Oct. 19, 1972, 72.37140

Int. Cl.² C07C *179/02*

U.S. Cl. 260—610 B 8 Claims



1. In a process for the hydroperoxidation is isopentane or isobutane, which comprises oxidizing with oxygen said isopentane or isobutane in the liquid state, at a temperature of 100° C to 200° C under a pressure of 5 to 80 bars, by successive passes in successive reactors arranged in series, the improvement comprising the step of washing the oxidation products at a temperature of between 15° C to 100° C, under a pressure of 1 to 80 bars, between at least two oxidizing reactions, by an extraction agent chosen from the group consisting of water and an aqueous solution presaturated with the oxidation products from said process from which the acetic acid reaction product has been substantially removed.

4,002,688

PROCESS FOR CRYSTALLIZING 2,2-BIS[3,5-DIBROMO-4-(2-HYDROXYETHOXY)PHENYL] PROPANE

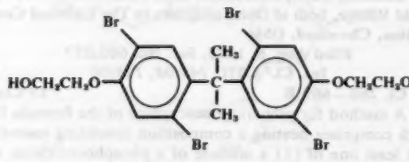
Barry L. Loeb, and Kenneth J. Witsken, both of Cincinnati, Ohio, assignors to Emery Industries, Inc., Cincinnati, Ohio

Filed Mar. 28, 1975, Ser. No. 563,254

Int. Cl.² C07C *41/12*

U.S. Cl. 260—613 R 6 Claims

1. A process for crystallizing 2,2-bis[3,5-dibromo-4-(2-hydroxyethoxy)phenyl] propane containing at least 85% by weight of the diethoxylated product of the formula



and less than 1% by weight solvent and water impurities which comprises applying a shear force of 25,000 and 60,000 joules per kilogram to a 105° to 120° C melt of said product for a period of at least 0.5 minute while lowering the temperature of the melt 15 to 30° C.

4,002,689

MODIFIED, FIRE RETARDANT POLYTETRAMETHYLENE ETHER GLYCOL

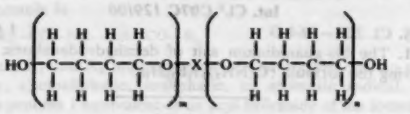
Hideo Tomomatsu, Crystal Lake, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Division of Ser. No. 505,535, Sept. 13, 1974, Pat. No. 3,936,425. This application Apr. 28, 1975, Ser. No. 572,071

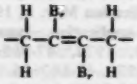
Int. Cl.² C07C *43/17*

U.S. Cl. 260—615 R 2 Claims

1. A glycol composition having the following structural formula:



wherein *m* and *n* are integers including zero, and wherein both *m* and *n* are not zero at the same time, and wherein X is a structure having the formula:



wherein *m* and *n* are such that the number average molecular weight of the composition is in the range of 400–5000, inclusive.

4,002,690

4-HOMOISOTWIST-3-YL-CARBINOL

Yoshiaki Inamoto; Hiroshi Ikeda; Naotake Takaishi, all of Wakayama, and Kiyoshi Tsuchihashi, Kainan, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed July 14, 1975, Ser. No. 595,557

Claims priority, application Japan, July 16, 1974, 49-81534

Int. Cl.² C07C *35/22*

U.S. Cl. 260—617 F 1 Claim

1. 4-Homoisotwist-3-yl-carbinol.

4,002,691

POLYCYCLIC COMPOUNDS

Lawrence H. Shepherd, Jr., Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 401,210, Sept. 27, 1973, which is a continuation-in-part of Ser. No. 291,647, Sept. 25, 1972, Pat. No. 3,810,949, which is a continuation-in-part of Ser. No. 888,071, Dec. 24, 1969, abandoned. This application Aug. 22, 1975, Ser. No. 606,762

Int. Cl.² C07C *35/00*

U.S. Cl. 260—617 F 1 Claim

1. Tricyclo[4.2.1.0^{2,5}]non-7-en-3-yl-methanol.

4,002,692

PROCESS FOR THE REACTIVATION OF NICKEL CATALYSTS USED IN THE HYDROGENATION OF POLYMERIC PEROXIDES

Shunsuke Mabuchi; Kenji Tsuzuki, and Hideaki Matsunaga, all of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Yamaguchi, Japan

Filed Oct. 3, 1975, Ser. No. 619,227

Claims priority, application Japan, Oct. 15, 1974, 49-117694

Int. Cl.² C07C *29/00*; B01J *37/00*

U.S. Cl. 260—617 R 5 Claims

1. In a process for the hydrogenation of an organopolymeric peroxide in the presence of a nickel catalyst with hydrogen in an organic solvent, the improvement comprising:

reactivating said nickel catalyst by contacting it with a reactivating medium consisting essentially of hydrogen and an oxygen-containing polar organic solvent at a temperature of 140°–250° C;

said oxygen-containing polar solvent being stable under conditions of the reactivation; and

recycling the reactivated nickel catalyst to said hydrogenation.

4,002,693

PROCESS FOR THE PRODUCTION OF O-PHENYLPHENOL

Ian Robert King, Warrington, and Anthony MacDonald Hildon, Linslade, Leighton Buzzard, both of England, assignors to Laporte Industries Limited, London, England

Filed Feb. 18, 1975, Ser. No. 550,768

Claims priority, application United Kingdom, Feb. 28, 1974, 9130/74

Int. Cl.² C07C *45/00, 37/06*

U.S. Cl. 260—620 **9 Claims**

1. In a method of preparing an O-phenyl phenol from a cyclohexanone which comprises the steps of

a. condensing the cyclohexanone in the presence of a condensation catalyst other than a naphthenate to form a reaction mixture containing an O-cyclohexenyl cyclohexanone,

b. removing the O-cyclohexenyl cyclohexanone from the reaction mixture, and

c. dehydrogenating the O-cyclohexenyl cyclohexanone from step (b) by contacting it with a noble metal dehydrogenation catalyst, selected from the group consisting of ruthenium, rhodium, osmium, iridium, platinum and palladium,

the improvement wherein the dehydrogenation step is conducted in the presence of sulphur in the form of elemental sulphur or organo-sulphides or thiols, the sulphur/dehydrogenation catalyst metal weight ratio being from about 1/60 to 1/12, to improve the selectivity of the said dehydrogenation catalyst with respect to the formation of O-phenyl phenol.

4,002,694

ETHYNYLATION CATALYST AND PROCESS FOR PRODUCING ALKYNOLS

Eugene V. Hort, Wayne, N.J., assignor to GAF Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 246,607, April 24, 1972, Pat. No. 3,900,759. This application Aug. 11, 1975, Ser. No. 603,642

Int. Cl.² C07C *29/00, 33/04*

U.S. Cl. 260—635 Y **18 Claims**

1. In a process for preparing an acetylenic alcohol by reacting a lower alkanol with acetylene at about 60° C to about 120° C., the improvement which comprises effecting reaction with acetylene at less than about 2 atmospheres partial pressure of acetylene in the presence of an ethynylation catalyst comprising a water-soluble cuprous acetylide complex and a stable transitional alumina powder carrier therefor having a H_2O/Al_2O_3 mole ratio of about 0.02 to about 0.5 and a surface area of at least about 10 m^2/g, said cuprous acetylide complex being present in a concentration sufficient to catalyze the reaction of said aldehyde and said acetylene to said acetylenic alcohol.

4,002,695

PROCESS FOR MAKING TETRACHLOROETHYLENE

Earl M. Gorton, and Robert E. McGreevy, both of Sulphur, La., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 6, 1976, Ser. No. 655,930

Int. Cl.² C07C *21/00*

U.S. Cl. 260—654 D **3 Claims**

1. A method of making tetrachloroethylene which comprises contacting a reaction mixture of carbon tetrachloride vapor and elemental hydrogen with a barium chloride catalyst at a temperature of at least 500° C. and thereafter recovering tetrachloroethylene from the reaction product.

4,002,696

OXIDATIVE DEHYDROGENATION OF OLEFINS OVER A HIGH ACTIVITY COBALT-MOLYBDATE CATALYST

Frederic H. Hoppstock, Massillon, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed June 30, 1975, Ser. No. 591,264

Int. Cl.² C07C *15/10, 11/12*

U.S. Cl. 260—669 R **10 Claims**

1. In the process of oxidative dehydrogenation of at least one hydrocarbon selected from the group consisting of butene-1, butene-2, 2-methyl-1-butene, 2-methyl-2-butene, 3-methyl-1-butene, n-pentene, 2,3-dimethyl-1-butene, 2,3-dimethyl-2-butene, 2-methyl-1-pentene, 2-methyl-2-pentene, 4-methyl-2-pentene, 3-methyl-1-pentene and 3-methyl-2-pentene, 2-ethyl-1-butene, under oxidative dehydrogenation conditions while in the presence of a catalyst consisting of cobalt-molybdate or cobalt-molybdate treated with potassium hydroxide in amounts from about 0.5 to about 2 percent by weight of the cobalt-molybdate in the presence of an oxidant in an amount to provide an oxygen/hydrocarbon mole ratio ranging from about 0.5/1 to about 5/1 at a temperature ranging from about 350° C to about 650° C and an LHSV of from about 0.5 to about 10, the improvement which comprises calcining the cobalt-molybdate or cobalt-molybdate treated with potassium hydroxide at temperatures between about 750° C and about 1100° C for at least one hour prior to use.

7. In the process of oxidative dehydrogenation of at least one hydrocarbon selected from the group consisting of ethyl benzene and isopropyl benzene under oxidative dehydrogenation conditions while in the presence of a catalyst consisting of cobalt-molybdate or cobalt-molybdate treated with potassium hydroxide in amounts from about 0.5 to about 2 percent by weight of the cobalt-molybdate in the presence of an oxidant in an amount to provide an oxygen/hydrocarbon mole ratio ranging from about 0.5/1 to about 5/1 at a temperature ranging from about 350° C. to about 650° C. and an LHSV of from about 0.5 to about 10, the improvement which comprises calcining the cobalt-molybdate or cobalt-molybdate treated with potassium hydroxide at temperatures between about 750° C. and about 1100° C. for at least one hour prior to use.

4,002,697

SELECTIVE PRODUCTION OF PARA-XYLENE

Nai Yuen Chen, Titusville, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 421,459, Dec. 3, 1973, abandoned. This application Sept. 25, 1974, Ser. No. 509,188

Int. Cl.² C07C *3/52*

U.S. Cl. 260—671 M **15 Claims**

1. In a process for manufacture of xylene by reacting toluene with a methylating agent in the presence of a crystalline aluminosilicate catalyst, the improvement resulting in a proportion of p-xylene greater than the thermo dynamic equilibrium proportion of total xylenes which comprises conducting the reaction in the presence of catalyst particles of ZSM-5, ZSM-11 or ZSM-21 of average crystal size greater than 0.5 micron, said catalyst particles having been surface deactivated by reaction with a compound of nitrogen or silicon of a size sufficiently large as to be unable to penetrate the pore structure of said crystalline aluminosilicate.

4,002,698

METHYLATION OF TOLUENE IN THE PRESENCE OF A PHOSPHORUS-MODIFIED ACTIVATED CRYSTALLINE ALUMINOSILICATE CATALYST

Warren W. Kaeding, Westfield, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 19, 1975, Ser. No. 605,968
Int. Cl.² C07C 13/52, 15/08
U.S. Cl. 260—671 M 18 Claims

1. A process for the methylation of toluene to selectively yield para-xylene which comprises contacting toluene with a methylating agent under methylation conditions in the presence of a catalyst comprising a crystalline aluminosilicate zeolite, said zeolite having a silica to alumina ratio of at least about 12, a constraint index within the approximate range of 1 to 12, said catalyst having been modified by the addition thereto of phosphorus in an amount of at least 0.5 percent by weight and activated by vapor phase treatment with a mixture of methanol and water at a temperature between about 400° C. and about 650° C. for a period of at least about 1 hour.

11. A method of activating a catalyst comprising a crystalline aluminosilicate zeolite, said zeolite having a silica to alumina ratio of at least about 12, a constraint index within the approximate range of 1 to 12, said catalyst having been modified by the addition thereto of phosphorus in an amount of at least 0.5 percent by weight which comprises subjecting said catalyst to vapor phase treatment with a mixture of methanol and water at a temperature between about 400° C. and about 650° C. for a period of at least about 1 hour.

4,002,699

POWDER COATING COMPOSITION WITH HYDROXY FUNCTIONAL COPOLYMER AND AMINO FUNCTIONAL CROSSLINKING AGENT

Santokh S. Labana, Dearborn Heights, and Yun Feng Chang, Plymouth, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Continuation-in-part of Ser. No. 407,128, Oct. 17, 1973, abandoned, which is a continuation of Ser. No. 172,223, Aug. 16, 1971, abandoned. This application Nov. 25, 1974, Ser. No. 526,546
Int. Cl.² C08L 33/04, 61/20
U.S. Cl. 260—851 8 Claims

1. A powder coating composition which, exclusive of pigments and other nonreactive components, comprises a coreactive mixture of: (A) a copolymer of about 5 to about 20 weight percent of a hydroxy functional monoethylenically unsaturated monomer selected from the group consisting of hydroxyl bearing aliphatic alcohol esters of acrylic and methacrylic acid and about 95 to about 80 weight percent of other monomers containing alpha-beta olefinic unsaturation, said copolymer having a glass transition temperature in the range of about 40° C to about 90° C and a molecular weight ($\overline{M}_n$) in the range of 2,000 to 10,000; (B) an amino functional crosslinking agent of condensation products of formaldehyde and an amine of melamine, substituted melamines, urea, benzoguanamine or substituted benzoguanamines in an amount of between about 0.8 and about 1.1 crosslinkable functional groups for each hydroxy group in the copolymer; and (C) from about 0.05 to about 4.0 weight percent based on the total weight of said coating composition of a polymeric flow control agent having a number average molecular weight of at least 1,000, a surface tension which is lower than the surface tension of said copolymer at the baking temperature of said composition and a glass transition temperature which is at least 50° C below the glass transition temperature of said copolymer and which consists essentially of an acrylic polymer prepared by polymerization of acrylate or methacrylate monomers.

4,002,700

PROCESS FOR PREPARING A LIQUID RESINOUS COMPOSITION AND THE COMPOSITION

Hiroshi Fukuzaki; Masao Niki; Yukinaga Yokota, and Jun-ichi Furukawa, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Nov. 10, 1975, Ser. No. 630,136
Claims priority, application Japan, Nov. 15, 1974, 49-131662
Int. Cl.² C08L 67/06; C08G 63/76
U.S. Cl. 260—872 9 Claims

1. A process for the preparation of liquid resinous compositions characterized by reacting a dibasic acid component containing at least one α,β-unsaturated basic acid with a glycol component to form an unsaturated polyester having an acid value of at least 10 and a molecular weight ranging from 1,000 to 10,000, mixing the so formed unsaturated polyester with water containing at least one basic component or a water-lower alcohol mixture containing at least one basic component to neutralize unreacted carboxyl groups in the unsaturated polyester by salt-forming reaction, and then subjecting the resulting water-solubilized unsaturated polyester composition to addition reaction with at least on monovinyl compound selected from the group consisting of (I) acrylic acid, methacrylic acid and alkali metal and ammonium salts thereof, (II) hydroxyalkyl ($C_1 - C_3$) esters of acrylic acid, aminoalkyl ($C_1 - C_3$) esters of acrylic acid, hydroxyalkyl ($C_1 - C_3$) esters of methacrylic acid and aminoalkyl ($C_1 - C_3$) esters of methacrylic acid, (III) acrylamide, methacrylamide and vinylpyrrolidone, (IV) N-methylolated compounds of acrylamide, alkyl ($C_1 - C_3$) etherified N-methylolated compounds of acrylamide, N-methylolated compounds of methacrylamide and alkyl ($C_1 - C_3$) etherified N-methylolated compounds of methacrylamide, and (V) methyl acrylate, ethyl acrylate, methyl methacrylate and ethyl methacrylate, the amount of said monovinyl compound being within a range of $0.1 < M_2/M_1 < 5$ in which M_1 indicates the mole number of the unsaturated dibasic acid contained in the polyester and M_2 denotes the mole number of the monovinyl compound to be added.

4,002,701

POLYPHENYLENE ETHER RESIN COMPOSITIONS CONTAINING AN N-ALKANOYL-P-AMINOPHENOL STABILIZER

Arthur Katchman, Delmar, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Filed Nov. 25, 1974, Ser. No. 527,138
Int. Cl.² C08L 23/00, 25/00
U.S. Cl. 260—874 18 Claims

1. A thermoplastic molding composition having improved resistance to thermal aging in the presence of air which comprises:

a. a polyphenylene ether resin;
b. a vinyl aromatic resin; and
c. an amount of an N-alkanoyl-p-aminophenol sufficient to improve the resistance of said composition to thermal aging.

4,002,702

NOVEL METHOD FOR MANUFACTURING PLASTISOL RESINS

Leroy B. Kuhn, Easton, Conn., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 403,363, Oct. 4, 1973, abandoned, which is a continuation-in-part of Ser. No. 202,456, Nov. 26, 1971, abandoned. This application Sept. 18, 1974, Ser. No. 506,131
Int. Cl.² C08L 27/06
U.S. Cl. 260—899 14 Claims

1. A process for preparing blends of emulsion and nucleating resins suitable for use in preparing plastisols and organosols, said process comprising the steps of:

a. admixing an aqueous latex comprising a continuous aqueous phase in which there are dispersed a plurality of particles of a vinyl chloride emulsion resin having an average diameter in the range of from about 0.1 to about 3.0 microns and a relative viscosity of from about 1.5 to about 3.5, as determined at 25° C. with a 1.0%, by weight, solution of the resin in cyclohexanone, with a plurality of particles of a vinyl chloride nucleating resin, said vinyl chloride nucleating resin particles having an average unit particle diameter in the range of from about 5 to about 60 microns, said nucleating resin particles being admixed with said emulsion resin particles while said nucleating resin particles have a moisture content of from about substantially zero to about 50%, by weight; the wet blend resulting from step (a) having a total resin solids content in the range of from about 30 to about 75%, by weight, of which from about 30 to about 99%, by weight, is emulsion resin particles and from about 70 to about 1%, by weight, is nucleating resin particles; and

b. spray drying the wet blend of dispersion and extender resin particles resulting from step (a) under non-coagulating conditions at a temperature sufficiently low that the particles are not permanently bound when added to a plasticizer, to obtain said blend in the form of a dry powder.

4,002,703

GRAFT COPOLYMERS BASED ON METHYL METHACRYLATE POLYMERS

Gerhard Fahrbach, Schwetzingen; Erhard Seiler, Ludwigshafen, and Dieter Stein, Limburgerhof, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen(Rhine), Germany

Division of Ser. No. 409,257, Oct. 24, 1973, Pat. No. 3,933,943. This application Aug. 12, 1975, Ser. No. 603,857

Claims priority, application Germany, Oct. 26, 1972, 2252508

Int. Cl.² C08L *33/04*

U.S. Cl. 260—901 **1 Claim**

1. A process for the manufacture of grafting living polyalkylene oxide on methyl methacrylate polymers, wherein a polymer of methyl methacrylate (A) containing at least 10% by weight of polymerized units of methyl methacrylate is reacted with a high molecular weight organic compound (B) consisting essentially of polyalkylene oxide with at least one alkylene oxide unit having an alkali metal alcoholate end group, said reaction being carried out in an anhydrous inert organic solvent by mixing solutions of components A and B at from −50° to +100° C.

4,002,704

CARBURETOR

Bernard R. Laprade; Xavier J. Laprade, both of Arudy, and Pierre J. Gele, Laloubere, all of France, assignors to Societe Nationale des Petroles d'Aquitaine, Tour Aquitaine Paris la Defense and Les Usines Laprade, Arudy, both of, France

Filed June 12, 1974, Ser. No. 478,600

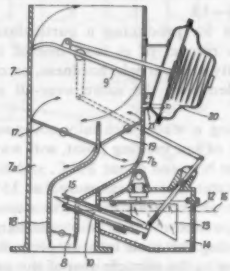
Claims priority, application France, June 29, 1973, 73.23919

Int. Cl.² F02M *11/02*

U.S. Cl. 261—23 A **7 Claims**

1. A carburetor of the constant vacuum type comprising:

a body defining an air passage, first means carried by said body and defining a main air passageway of predetermined cross-sectional area and forming part of said air passage at a predetermined location therealong, second means carried by said body and defining an auxiliary air passageway of predetermined cross-sectional area and forming the remaining part of said air passage at said predetermined location therealong, an auxiliary throttle in said air passage upstream of both said main air passageway and said auxiliary air passageway, means defining a chamber for containing petrol, a petrol metering element in communication with said petrol chamber and having an adjustable aperture located in said auxiliary air passageway for discharging petrol from said petrol chamber into said auxiliary air passageway, said adjustable aperture being located substantially coincident with the centroid of the predetermined cross-sectional area of the auxiliary passageway for discharging petrol substantially centrally of the air stream flowing through said auxiliary passageway, a first main throttle element carried by said body in said main air passageway, a second main throttle element carried by said body in said auxiliary passageway



and downstream of said adjustable aperture, means coupling said auxiliary throttle in said air passage and said petrol metering element for adjusting the petrol flow through said aperture in accordance with the flow of air through said air passage past said auxiliary throttle element, said main air passageway and at least a downstream portion of said auxiliary passageway containing said adjustable aperture being substantially coaxial one with the other with said downstream portion of said auxiliary passageway lying within said first means, said adjustable aperture being located substantially coincident with the substantially common axes of said main air passageway and the downstream portion of the auxiliary passageway.

4,002,705

FLUID-FLUID CONTACT APPARATUS

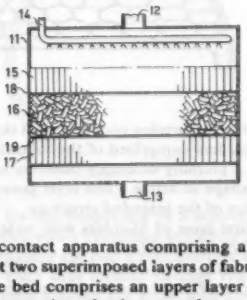
Kevin Joseph McKeown, Windermere, England, assignor to Mass Transfer Limited, Kendal, England

Continuation of Ser. No. 336,209, Feb. 27, 1973, abandoned. This application June 10, 1975, Ser. No. 585,702

Claims priority, application United Kingdom, Mar. 1, 1972, 9650/72; Apr. 12, 1972, 16971/72

Int. Cl.² B01F *3/04*

U.S. Cl. 261—98 **4 Claims**



1. Gas-liquid contact apparatus comprising a packed bed formed of at least two superimposed layers of fabricated packings in which the bed comprises an upper layer of randomly dumped packing members having a surface area per unit volume of 25–45 square feet per cubic feet and comprising tubular elements having a diameter to width ratio greater than 1.5:1, a plurality of ribs extending inwardly from said tubular

elements, said randomly dumped packing members being superimposed on a lower layer of stacked packing having a surface area per unit volume of 45–60 square feet per cubic feet; and means for introducing a gas and a liquid into the bed for contact therein.

4,002,706

WAX AND WAX BLENDS

Dirk Jacobus Pretorius, 3 Vanderbijl St., Sasolburg 9570, South Africa

Continuation of Ser. No. 445,079, Feb. 25, 1974, abandoned. This application Feb. 20, 1975, Ser. No. 551,302
Int. Cl.² B22D *23/08*; C08L *91/08*
U.S. Cl. 264—13 30 Claims

1. Process for producing a particulate wax composition improved in respect of at least one of the properties: free flowing ability and particle hardness, as compared with conventional blends of the same over-all composition, which comprises:

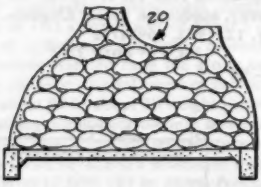
a. preparing a melt essentially composed of a substantial content of low melting point, soft wax having a congealing point between about 20° C. and 80° C. and a penetration greater than 80 measured at 25° C., 10^{-1} mm, and another wax superior thereto in respect of at least one of the properties: melting point and hardness;
b. converting the melt into droplets, having a size corresponding to the particle size of the particulate wax composition being produced;
c. suspending the droplets in a cooling medium;
d. whilst thus suspended, over a period of between about 7 and 20 seconds, causing said droplets to solidify progressively from the outside inwardly by the chilling action of the cooling medium; and
e. collecting as said particulate wax composition a free flowing powdered product consisting of the said droplets in externally solidified form, the wax superoir in respect of melting point and/or hardness being concentrated in the outer region of the droplets.

4,002,707

METHOD AND APPARATUS FOR THE CONSTRUCTION OF CONCRETE SHELLS

Michael Allen Oram, 1022 Neil Ave., Columbus, Ohio 43201

Filed June 23, 1975, Ser. No. 589,459
Int. Cl.² E04B *1/16*
U.S. Cl. 264—31 1 Claim



1. The method of forming concrete shell structures utilizing waterfilled bladders comprised of the following steps:

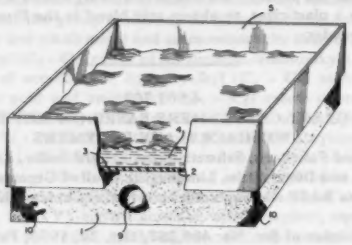
a. position a plurality of empty bladders of predetermined size and shape to define a first layer generally conforming to the plan of the intended structure
b. fill the first layer of bladders with water to form a first layer of inflated bladders;
c. position a second layer of unfilled bladders on top of the inflated preceeding layer in an overlapping manner;
d. fill the second layer of bladders so that the weight of the water and the pattern in which the bladders are arranged tend to stabilize the arrangement of said bladders and minimize the effect of liquid distortion;
e. repeat the above procedure utilizing successive layers of bladders to form a mold with the desired configuration, the surface of the mold so formed consisting solely of the layered, inflated bladders;
f. cover the mold with a layer of wire mesh reinforcing and cast a thin walled concrete shell utilizing commonly accepted construction practice;
g. allow the concrete shell to harden, then successively drain and remove the deflated bladders through preformed openings in the contemplated shell.

4,002,708

METHOD FOR PRODUCING POLYMER IMPREGNATED FOAMED MASONARY ELEMENTS

James L. Lott, Champaign, Ill., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 28, 1971, Ser. No. 193,495
Int. Cl.² B29H *7/20*
U.S. Cl. 264—42 3 Claims



1. A method for producing polymer impregnated foamed masonry elements comprising:

a. blending a preformed foam lather and a mixture of cement, sand and water to produce a paste having foam voids ranging from 50–65 per cent of the paste volume;
b. casting and curing said paste in a predetermined form;
c. surrounding one surface of said cured, cast form with a liquid tight enclosure;
d. removing any latent paste cement film from said one surface and covering said one surface with a layer of an impregnating polymerizable liquid of relatively high viscosity;
e. covering said polymerizable liquid layer with a water impervious sheet;
f. covering said water impervious sheet with water to a depth sufficient to cause impregnation to a predetermined depth and in a predetermined time of said one surface by said polymerizable liquid throughout the dispersed void system within a region of said foamed masonry cast form adjacent said one surface;
g. polymerizing said impregnated liquid in situ;
h. removing said water, water impervious sheet, remaining polymerizable liquid and said liquid tight enclosure.

4,002,709

CONTROLLED AIR IN POLYESTER TUBE EXTRUSION FOR CLEAR SEALABLE PARISON

Larry P. Mozer, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

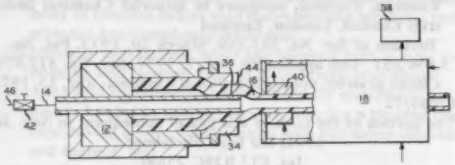
Filed Sept. 25, 1975, Ser. No. 616,533
Int. Cl.² B29C *17/07*; B29D *23/04*
U.S. Cl. 264—90 10 Claims

1. A process for producing a clear, easily sealed, saturated thermoplastic polyester tube comprising: heating a saturated thermoplastic polyester to a molten state;

forcing said molten polyester through an annular die to form a tube;

passing said thus formed tube to and through an external sizing sleeve maintained under a vacuum and bringing said tube out into conformity with said external sizing sleeve by means of said vacuum;

maintaining free communication between a downstream end of said tube and ambient air with no internal restriction on air movement within said tube downstream of a



face of said die, said tube being periodically severed so that said downstream end thereof is separated from said die face by distance equal to 50 to 800 times the internal diameter thereof; and

wherein the sole communication with any fluid through said die is with ambient air introduced through a conduit having an effective internal diameter of 0 to 50 percent of the internal diameter of said tube.

4,002,710

PROCESS FOR THE PRODUCTION OF SHAPED ARTICLES OF PLASTIC MATERIAL COMPOSED OF CHEMICALLY MODIFIED PROTEIN

Klaus-Dieter Hammer, Mainz; Walter Busch, and Wolfgang Klendauer, both of Wiesbaden, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

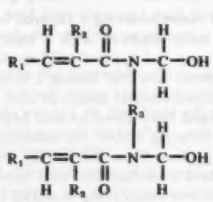
Filed Oct. 3, 1975, Ser. No. 619,223

Claims priority, application Germany, Oct. 7, 1974, 2447680

Int. Cl.² C08L *89/00*

U.S. Cl. 264—183 31 Claims

1. A process for the production of a shaped article of a plastic material of chemically modified protein, which comprises mixing an alkaline aqueous protein solution with an aqueous solution of an organic tetrafunctional, unsaturated compound of the general formula



in which

R_1 and R_2 are hydrogen or an alkyl group with 1 to 6 carbon atoms, and

R_3 is the group $-(CH_2)_n-$, n being an integer from 1 to 8, or the group

in which R_4 is an alkyl group with 1 to 18 carbon atoms,

spinning the resulting viscous liquid ready for spinning by means of a shaping die into a precipitating liquid, washing the shaped article with a washing liquid, causing an aqueous solution of an organic, saturated, at least bifunctional compound to act on the article, heating the article, optionally causing plasticizer liquid to act on it, and drying.

4,002,711

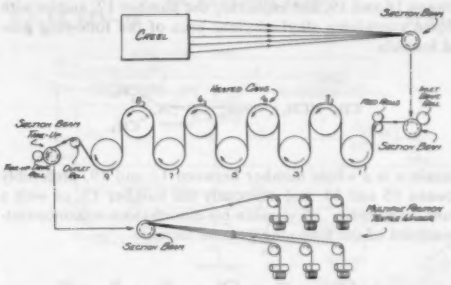
METHOD FOR DRAWING POLYURETHANE FILAMENTS

Timothy V. Peters, Rte. 3, Box 193, Lebanon, N.J. 08833

Continuation of Ser. No. 126,129, March 19, 1971, abandoned. This application May 22, 1974, Ser. No. 472,185

Int. Cl.² D01D *5/06, 5/12*

U.S. Cl. 264—184 7 Claims



1. The method of reducing the denier of a dry, finished filament formed from a substantially linear polyurethane, said polyurethane being produced by chain extension of a prepolymer with a chain extender selected from the class of hydrazine and diamines, without substantially affecting the other physical properties of the filament, comprising elongating the filament a number of times its original length and heating it to a temperature above its "fiber stick temperature" for a sufficient time so that the filament substantially permanently retains that elongation and does not recover any substantial amount of the length to which it has been elongated.

4,002,712

PROCESS FOR THE PRODUCTION OF A PLASTICIZED SHAPED BODY FROM A CELLULOSE DERIVATIVE

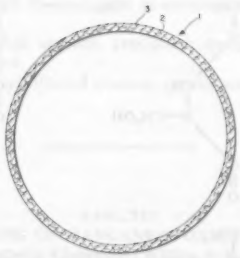
Klaus Dieter Hammer, Finthen, and Wolfgang Klendauer, Wiesbaden, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Dec. 16, 1974, Ser. No. 533,452

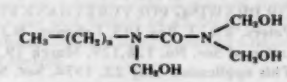
Claims priority, application Germany, Dec. 17, 1973, 2362551; Dec. 17, 1973, 2362770; Dec. 17, 1973, 2362606; Apr. 6, 1974, 2416891; Apr. 6, 1974, 2416892

Int. Cl.² D01F *2/08*

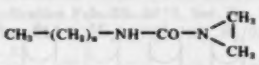
U.S. Cl. 264—194 43 Claims



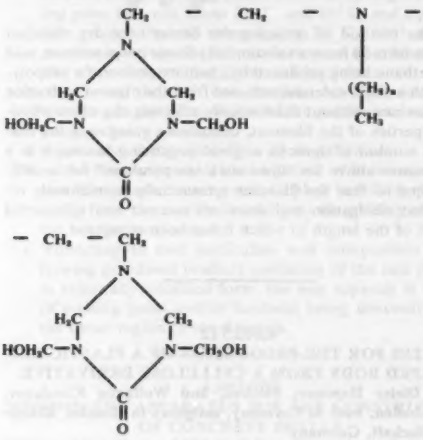
1. A process for the production of a shaped body from a cellulose derivative which comprises extrüding a viscose solution through a shaping die into a precipitation bath and passing the shaped body thus formed through regenerating and washing baths, then treating the body with an acid aqueous solution of a chemical plasticizer for regenerated cellulose, drying it by heating, and finally moistening it with water after drying, said viscose solution being mixed with a liquid containing alkyl-trimethylol-urea of the following general formula



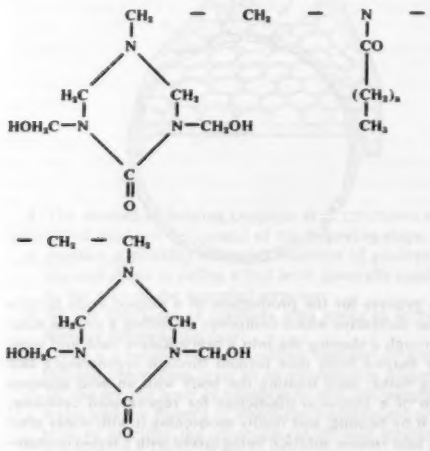
wherein *n* is a whole number between 9 and 24, preferably between 14 and 19, and especially the number 17, and/or with a liquid containing alkyl-ethylene-urea of the following general formula



wherein *n* is a whole number between 11 and 19, preferably between 15 and 18, and especially the number 17, or with a liquid containing alkylamine-bis-dimethylene-triazinonetetramethylol of the following general formula



wherein *n* is a whole number between 9 and 24, preferably between 14 and 19, and especially the number 17, or with a liquid containing alkylamide-bis-dimethylene-triazinonetetramethylol of the following general formula



wherein *n* is a whole number between 9 and 24, preferably between 14 and 19, and especially the number 17.

4,002,713

CEMENTING COMPOSITIONS AND CONCRETES AND MORTARS DERIVED THEREFROM

Frederic James Duncan, and Ronald George Chappell, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 343,169, March 20, 1973, Pat. No. 3,850,651. This application Oct. 7, 1974, Ser. No. 512,979

Claims priority, application United Kingdom, Apr. 13, 1972, 17069/72

The portion of the term of this patent subsequent to Nov. 26, 1991, has been disclaimed.

Int. Cl.² B29C *25/00*

U.S. Cl. 264—234 **16 Claims**

1. A method of preparation of a pre-cast shaped concrete article which comprises casting and curing a cementing composition initially including an inorganic cement, and an aqueous emulsion or dispersion of a water-insoluble polymer or copolymer derived from one or more alkyl methacrylates having from 1 to 8 carbon atoms in the alkyl group, the said polymer or copolymer having a glass transition temperature of at least 10° C. and the curing being effected, after initial setting, at an elevated temperature of at least 40° C.

4,002,714

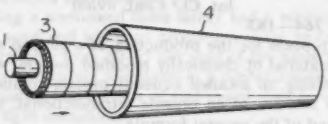
METHOD FOR PRODUCING A TAPERED PIPE OF REINFORCED SYNTHETIC RESIN

Fumio Usui, No. 441, Shimo Asao, Tama, Kawasaki, Kanagawa, Japan

Division of Ser. No. 280,209, Aug. 14, 1972, abandoned. This application Jan. 6, 1975, Ser. No. 538,774

Int. Cl.² B29C *5/04*; **B29D** *3/02, 23/00*

U.S. Cl. 264—250 **2 Claims**



2. A method of manufacturing a tapered bent pipe of reinforced synthetic resin material with a base plate integrally attached to the larger end thereof, said method comprising:

providing a tapered core bar having a first larger diameter end and a second smaller diameter end;

mounting a flanged base frame on said first end of said core bar, thereby forming a core bar assembly;

spirally winding glass fiber reinforcing material in plural layers over said core bar and said base frame, thereby forming a body of reinforcing material of predetermined shape;

inserting said core bar assembly with said body of reinforcing material thereon into a flexible one-piece mold having an interior configuration in the form of a tapered portion and, at the larger end thereof, an enlarged portion for receiving said base frame;

extracting said core bar from said mold while leaving said body of reinforcing material and said base frame in said mold;

bending a portion of said body of reinforcing material to cover an outer bottom portion of said base frame;

inserting said flexible mold having said body of reinforcing material and said base frame therein within a body of rotation;

pouring a predetermined amount of liquid thermosetting synthetic resin material into said mold;

inclining said mold and body of rotation from the horizontal position by a predetermined angle so that the larger end of said mold is higher than the smaller end;

rotating said mold and body of rotation at a predetermined rate of rotation while so positioned, thereby causing said resin material to permeate said body of reinforcing material, and causing said resin material to partially harden in said body of reinforcing material, thereby forming a tapered pipe having a base plate integral with the larger diameter end thereof;

removing said flexible mold and said tapered pipe from said body of rotation before said thermosetting synthetic resin material has completely hardened;

positioning said flexible mold and tapered pipe in a jig and bending said tapered pipe to a predetermined shape;

causing said thermosetting synthetic resin material to completely harden in said jig, thereby forming a tapered bent pipe having a base plate integral with the larger diameter end thereof; and

extracting said thus formed tapered bent pipe from said flexible mold.

4,002,715

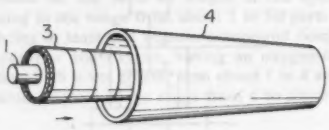
METHOD FOR PRODUCING A TAPERED PIPE OF REINFORCED SYNTHETIC RESIN

Fumio Usui, No. 441, Shimo Asao, Tama, Kawasaki, Kanagawa, Japan

Continuation of Ser. No. 280,209, Aug. 14, 1972, abandoned. This application Jan. 6, 1975, Ser. No. 538,773

Int. Cl.² B29C *5/04;* **B29D** *3/02, 23/00*

U.S. Cl. 264—250 **1 Claim**



1. A method of manufacturing a tapered pipe of reinforced synthetic resin material with a base plate integrally attached to the larger end thereof, said method comprising:

providing a tapered core bar having a first larger diameter end and a second smaller diameter end;

mounting a flanged base frame on said first end of said core bar, thereby forming a core bar assembly;

spirally winding glass fiber reinforcing material in plural layers over said core bar and said base frame, thereby forming a body of reinforcing material of predetermined shape;

inserting said core bar assembly with said body of reinforcing material thereon into a rigid one-piece mold having an interior configuration in the form of a tapered portion and, at the larger end thereof, an enlarged portion for receiving said base frame;

extracting said core bar from said mold while leaving said body of reinforcing material and said base frame in said mold;

bending a portion of said body of reinforcing material to cover an outer bottom portion of said base frame;

inserting said mold having said body of reinforcing material and said base frame therein within a body of rotation;

pouring a predetermined amount of liquid thermosetting synthetic resin material into said mold;

inclining said mold and body of rotation from the horizontal position by a predetermined angle so that the larger end of the mold is higher than the smaller end;

rotating said mold and body of rotation at a predetermined rate of rotation while so positioned, thereby causing said resin material to permeate said body of reinforcing material, and causing said resin material to harden in said body of reinforcing material, thereby forming a tapered pipe having a base plate integral with the larger diameter end thereof; and

axially removing said tapered pipe and integral base plate from said mold.

4,002,716

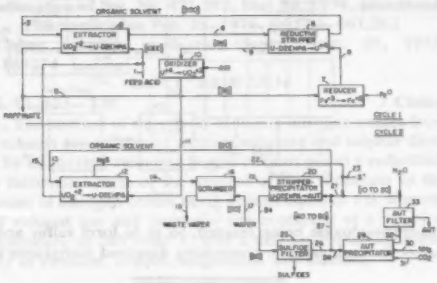
SULFIDE PRECIPITATION METHOD OF SEPARATING URANIUM FROM GROUP II AND GROUP III METAL IONS

Parameshwaran S. Sundar, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 23, 1973, Ser. No. 390,997

Int. Cl.² C01G *43/00*

U.S. Cl. 423—10 **21 Claims**



1. A method of separating uranium from iron in an acidic aqueous liquor containing uranyl ion comprising:

1. extracting the uranium from said liquor with a non-interfering, water-immiscible, organic solvent containing a reagent which reacts with said uranyl ion to form a complex soluble in said solvent, said solvent moving in a closed loop;

2. in either order

a. mixing with said solvent an aqueous solution containing about 0.5 to about 1 mole per liter of ions selected from the group consisting of $(NH_4)_2CO_3$, NH_4HCO_3, and mixtures thereof, ½ to 4/5 of said aqueous solution being recycled in a closed loop, and

b. contacting said recycled aqueous solution with sufficient sulfide ion to precipitate said metal ions as sulfides, said uranium remaining in solution;

3. permitting said solvent and said aqueous solution to separate;

4. separating said precipitated sulfides from said recycled aqueous solution;

5. adding to the 1/5 to ½ of said aqueous solution which was not recycled sufficient ions selected from the group consisting of $(NH_4)_2CO_3$, NH_4HCO_3, and mixtures thereof to bring said ion concentration in said non-recycled aqueous solution to about 1.5 to about 2.5 moles per liter, causing said uranium to precipitate as ammonium-uranyl-tricarbonate;

6. filtering said uranium precipitate from said aqueous solution; and

7. calcining said filtered uranium precipitate.

4,002,717

REFINING OF MANGANESE OXIDE ORES

Richard G. Sandberg, Gloucester; William S. Kane, Wicomico, and Paul H. Cardwell, Zanoni, all of Va., assignors to Deepsea Ventures, Inc., Gloucester Point, Va.

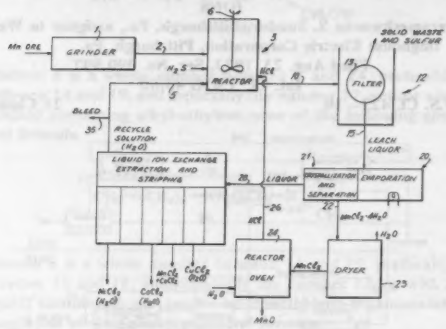
Filed Jan. 9, 1975, Ser. No. 539,872

Int. Cl.² B01D *11/04;* **B01F** *1/00*

U.S. Cl. 423—24 **34 Claims**

1. A method for treating manganese oxide ores including manganese having a valence greater than two, the method comprising contacting the manganese oxide ore in an aqueous slurry with an acid of a hydrogen halide and a sulfide compound selected from the group consisting of hydrogen sulfide

and metal sulfides, the sulfide compound being present in at least the stoichiometric amount to react with any acid and



manganese oxide being reacted, so as to form sulfur and an aqueous leach solution comprising dissolved manganese salt.

4,002,718

GELATIN-ENCAPSULATED DIGOXIN SOLUTIONS AND METHOD OF PREPARING THE SAME

Libero A. Gardella, Libertyville, and Helen Kesler, Barrington, both of Ill., assignors to Arnar-Stone Laboratories, Inc., Mount Prospect, Ill.

Filed Oct. 16, 1974, Ser. No. 515,087
Int. Cl.² A61J *3/07*; A61K *9/48*, *31/705*
U.S. Cl. 424—37 **21 Claims**

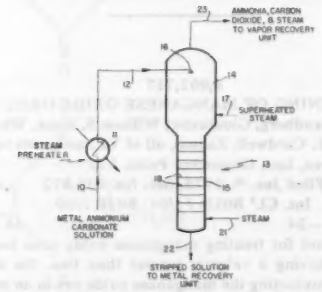
1. A method for preparing digoxin in encapsulated therapeutic dosage form, comprising the steps of reducing the size of digoxin particles to an average size no larger than about 10 microns, then mixing the micronized particles of digoxin with a solvent essentially alcohol-free and consisting predominantly of polyethylene glycol of a molecular weight no greater than about 1000, and heating the mixture at a temperature below the decomposition temperature of the drug until at least 0.5 milligrams of digoxin is dissolved in each milliliter of solvent, and then encapsulating therapeutic doses of the dissolved digoxin in gelatin capsules soluble in water but insoluble in said solvent.

4,002,719

RECOVERY OF NICKEL AND COBALT CARBONATES FROM AMMONIACAL LEACH SOLUTIONS

Utah Tsao, Jersey City, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed Sept. 22, 1975, Ser. No. 615,801
Int. Cl.² C01G *51/06*
U.S. Cl. 423—144 **6 Claims**


AMMONIA, CARBON DIOXIDE, & STEAM TO VAPOR RECOVERY UNIT
SUPERHEATED STEAM
STEAM PREHEATER
METAL AMMONIUM CARBONATE SOLUTION
STEAM
STRIPPED SOLUTION TO METAL RECOVERY UNIT

1. In a process for recovering a member selected from the group consisting of nickel, cobalt and mixtures thereof dissolved in an ammonium carbonate solution by stripping ammonia from the solution in a stripping column to precipitate the carbonate of said member, the improvement comprising:

spraying said solution into a flash chamber in an upper portion of the stripping column to flash a portion of the ammonia therefrom and precipitate a portion of said metal carbonate as a fine precipitate in solution droplets formed in said spraying; and

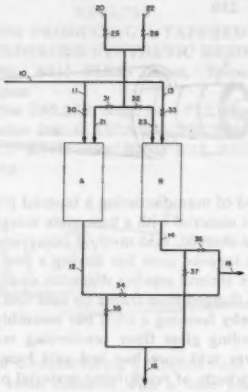
stripping said solution containing the fine precipitate of metal carbonate in the lower portion of the stripping column wherein further ammonia is stripped from the solution to precipitate further amounts of said metal carbonate, said fine precipitate functioning as nuclei for the precipitated further amounts to reduce deposition of precipitate on column surfaces.

4,002,720

GAS DESULFURIZATION

Kenneth S. Wheelock, and Geoffrey R. Say, both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 24, 1974, Ser. No. 536,164
Int. Cl.² B01D *53/34*
U.S. Cl. 423—230 **17 Claims**



1. A process for removing by sorption at least a portion of acidic gases selected from the group consisting of hydrogen sulfide, carbonyl sulfide and mixtures thereof from a gaseous mixture containing the same, which process comprises: contacting said gaseous mixture with a sorbent comprising (i) a pre-steamed inorganic oxide support selected from the group consisting of alumina, silica-alumina, zirconia, magnesia, boria and vanadia and (ii) a rare earth metal component.

4,002,721

PROCESS IMPROVEMENT IN THE ABSORPTION OF ACID GAS FROM A FEED GAS

Joseph C. Guffy, El Cerrito; Robert A. Winkler, Berkeley, and Marvin H. Paulson, El Cerrito, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

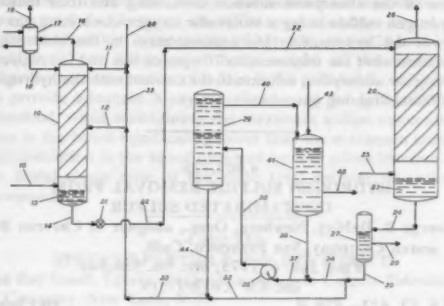
Filed Sept. 26, 1974, Ser. No. 509,507
Int. Cl.² B01D *53/34*
U.S. Cl. 423—232 **13 Claims**

1. In a cyclic process for absorbing acid gas from a normally gaseous feed comprising said acid gas by contacting the feed with a regenerable alkaline scrubbing solution comprising an aqueous solution containing at least one alkaline acid-gas absorbing agent in a first contact zone under gasliquid absorption process conditions, including:

1. an excessive foaming of the aqueous solution;

2. withdrawing at least a portion of said contacted solution from the first contact zone; and
3. recycling of the withdrawn solution to the first contact zone,

the improvement which comprises substantially reducing said foaming by contacting in a second contact zone at least a portion of said withdrawn solution with a hydrocarbon solvent under liquid-liquid extracting conditions, said solvent com-



prising at least one normally liquid hydrocarbon containing at least 7 carbon atoms and said solvent containing an effective amount of a hydrocarbon-soluble extraction adjuvant, said amount, based on 100 parts by weight of the hydrocarbon solvent, being in the range from about 2 to 50 parts and said adjuvant being at least one organic compound composed of carbon, hydrogen and oxygen, having an oxygen-to-carbon atomic ratio which is not greater than about 1 to 4 and having a carbon atom content in the range from 4 to about 18.

4,002,722
PROCESS AND APPARATUS FOR WET TREATMENT OF VENT GAS

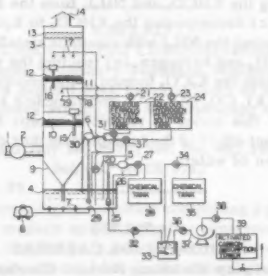
Hiroshi Suzuki, Kariya; Shigeru Ito, Toyokawa; Kazuyuki Nishikawa, Hoi, and Tutomu Shibata, Toyokawa, all of Japan, assignors to Sintokogio, Ltd., Nagoya, Japan

Filed Mar. 12, 1975, Ser. No. 557,451

Claims priority, application Japan, Mar. 16, 1974, 49-30215

Int. Cl.² B01D *53/34*

U.S. Cl. 423—238 **8 Claims**



1. A process for wet treatment of vent gas containing at least one disagreeable odor component selected from the group consisting of phenols, formaldehydes and ammonia, which comprises adding a ferrous salt and hydrogen peroxide to an aqueous absorbent solution in an absorption tower provided with an aqueous absorbent solution tank and filter layers for absorption of the disagreeable odor components, thereby making the ferrous ion concentration at least one-seventh of the hydrogen peroxide concentration in the aqueous absorbent solution, and adjusting an oxidation-reduction potential of the thus added absorbent solution at least to a value of (540 − 60 × pH value) mV, said pH value being 5 or less and contacting said vent gas with said aqueous absorbent solution.

4,002,723
METHOD OF REMOVAL OF NITROGEN OXIDES

Hideya Inaba; Shigenori Onizuka, and Yasumi Kamino, all of Osaka, Japan, assignors to Hitachi Shipbuilding and Engineering Co., Ltd., Osaka, Japan

Continuation of Ser. No. 471,292, May 20, 1974, abandoned. This application Feb. 25, 1976, Ser. No. 661,262

Claims priority, application Japan, Sept. 29, 1973, 48-109774

Int. Cl.² B01D *53/34*

U.S. Cl. 423—239 **7 Claims**

1. The method of selectively reducing nitrogen oxides from an exhaust gas containing oxygen, moisture and sulphur dioxide by employing ammonia in said exhaust gas as a reductant, the theoretical ratio of the amount of said reductant to the amount of nitrogen oxides being at least equal to 1.0, wherein said exhaust gas and ammonia are contacted at a reaction temperature of 240°–460° C with a catalyst consisting essentially of rhodium, copper, magnesium and alumina.

4,002,724
SULFUR DIOXIDE COLLECTION

R. Thomas McKie, 1411 Ranch Road, Boise, Idaho 83700

Continuation-in-part of Ser. No. 405,313, Oct. 11, 1973, abandoned. This application Nov. 21, 1975, Ser. No. 633,968

Int. Cl.² C01B *17/00*

U.S. Cl. 423—242 **11 Claims**

1. A method for cleansing SO_2-containing flue gas utilizing associated alkali-containing flyash comprising the steps of:

a. scrubbing flue gas containing SO_2 and associated alkali-containing flyash with an aqueous scrubbing agent, using the said alkali-containing flyash as the primary SO_2 neutralizing agent;
b. classifying the scrubber discharge into an oversize fraction characterized by flyash particles greater than about 325 Tyler mesh size, and an undersize fraction characterized by flyash particles less than about 325 Tyler mesh size;
c. removing said undersize fraction to a settling pond;
d. clarifying the undersize scrubber discharge fraction into liquid and solid portions;
e. recycling the liquid portion of the clarified undersize scrubber discharge fraction for use as a liquid scrubbing agent in said scrubbing step, while separating the solid portion of the clarified undersize scrubber discharge fraction;
f. reducing the particle size of the oversize scrubber discharge fraction; and
g. recycling the reduced oversize fraction back in said scrubbing step for further reaction with sulfur dioxide, followed by subsequent clarifying, recycling and separating in accordance with steps (d) and (e) above whereby clarification of said undersize fraction is achieved without attendant slime and gook problems.

4,002,725
PROCESS FOR GROWING ACICULA OF RARE EARTH PENTAPHOSPHATES

Paul Michael Bridenbaugh, Whitehouse Station; Paul Foo-Hung Liao, Middletown, both of N.J.; Bruce Cedric Tofield, Abingdon, England, and Heinz Paul Weber, Middletown, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 9, 1975, Ser. No. 594,193

Int. Cl.² C01F *17/00*

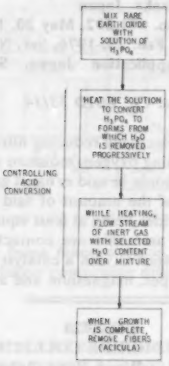
U.S. Cl. 423—263 **2 Claims**

1. A process for producing acicular of rare earth pentaphosphates with ratios of length to diameter of greater than about 25 to 1 comprising the steps of

mixing oxides of selected rare earths with a solution of H_3PO_4,

heating said solution to cause conversion of the H_3PO_4 to metaphosphoric acids and then heating to a temperature of approximately 550° C to develop more highly condensed poly acid forms, and

controlling the acid conversion during said heating by


MIX RARE EARTH OXIDE WITH SOLUTION OF H_3PO_4
HEAT THE SOLUTION TO CONVERT H_3PO_4 TO FORMS FROM WHICH H_2O IS REMOVED PROGRESSIVELY
CONTROLLING ACID CONVERSION
WHILE HEATING, FLOW STREAM OF INERT GAS WITH SELECTED H_2O CONTENT OVER MIXTURE
WHEN GROWTH IS COMPLETE, REMOVE FIBERS (ACICULA)

flowing a stream of gas over said mixture, said gas stream containing an inert gas and water vapor in the range between approximately 14 grams per cubic meter and approximately 290 grams per cubic meter, whereby acicula of rare earth pentaphosphates are obtained in said mixture, and

removing said acicula from said mixture.

4,002,726

METHOD OF RECYCLING LITHIUM BORATE TO LITHIUM BOROHYDRIDE THROUGH METHYL BORATE

Evan E. Filby, Rigby, Idaho, assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 16, 1975, Ser. No. 596,550

Int. Cl.² C01B *6/21*

U.S. Cl. 423—287 **8 Claims**

1. A process for the recovery of lithium borohydride from lithium borate formed as a by-product in the generation of hydrogen by the reaction of lithium borohydride with water comprising:

a. reacting the lithium borate with hydrogen chloride and water to produce boric acid and lithium chloride;

b. converting the boric acid to methyl borate;

c. reacting said methyl borate with sodium hydride to produce sodium borohydride; and

d. reacting the lithium chloride of step (a) with said sodium borohydride to produce lithium borohydride.

4,002,727

DESULFURIZATION PROCESS FOR HYDROGEN SULFIDE-CONTAINING GASES

Takezo Sonoda, Himeji; Masao Nakano, Hyogo; Michito Okane, and Hideo Suzuki, both of Himeji, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd, Osaka, Japan

Filed Dec. 16, 1974, Ser. No. 532,856

Claims priority, application Japan, Dec. 18, 1973, 48-14028

Int. Cl.² C01B *17/04*

U.S. Cl. 423—573 R **15 Claims**

1. In a process for the desulfurization of hydrogen sulfide-containing gases by contacting the hydrogen sulfide-containing gas with an aqueous alkali solution containing ammonium naphthoquinonesulfonate to cause absorption of hydrogen sulfide by said absorption solution and catalytically oxidizing by means of a molecular oxygen-containing gas the absorption solution thus obtained to separate out elementary sulfur, the improvement which comprises (a) carrying out the contact of the hydrogen sulfidecontaining gas using an absorption solution adjusted to its pH to 8 to 10 by ammonia and containing as catalyst components 10 to 2000 ppm ammonium naphthoquinonesulfonate and 0.01 to 1000 ppm of a variable valent metal compound, (b) carrying out the catalytic oxidation of the absorption solution containing absorbed therein hydrogen sulfide using a molecular oxygen-containing gas to lower the hydrosulfide ion concentration in the absorption solution after the treatment to 70 ppm or less and (c) recirculating the absorption solution to the contact with the hydrogen sulfidecontaining gas.

4,002,728

HYDROGEN SULFIDE REMOVAL FROM CONTAMINATED SULFUR

George B. DeMay, Newberg, Oreg., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jan. 6, 1975, Ser. No. 538,844

Int. Cl.² C01B *17/14*

U.S. Cl. 423—578 R **10 Claims**

1. A process for reducing the hydrogen sulfide content of hydrogen-sulfide-contaminated elemental sulfur, said sulfur containing at least an appreciable amount of said contaminant, which comprises extracting hydrogen sulfide from the sulfur by contacting the sulfur in the liquid phase with water, said contacting being effected using from 2 to about 10 extraction stages, being at a pressure sufficient to maintain the water in the liquid phase and at a temperature in the range from about the melting point of said sulfur to about 165° C.

4,002,729

METHOD FOR THERMOCHEMICAL DECOMPOSITION OF WATER

Bernard M. Abraham, Oak Park, and Felix Schreiner, Mokena, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 6, 1976, Ser. No. 674,199

Int. Cl.² C01B *13/02, 1/02*

U.S. Cl. 423—579 **7 Claims**

1. A method for decomposing water chemically comprising: (a) reacting KI, NH_3, CO_2 and H_2O to form $KHCO_3$ and NH_4I, (b) separating the $KHCO_3$ and NH_4I_2 from the H_2O and from each other, (c) decomposing the $KHCO_3$ to K_2CO_3, H_2O and CO_2, (d) reacting the NH_4I with vaporous metallic mercury to form HgI_2, NH_3 and hydrogen, (e) reacting the vaporous HgI_2 just formed with the K_2CO_3 formed in the previous reaction to produce Hg, KI, CO_2 and $\frac{1}{2}$ O_2 and recycling all compounds produced in this series of reactions except hydrogen and oxygen, the net effect of the total process thus comprising the decomposition of water.

4,002,730

RADIONUCLIDE CARRIERS

Frederick Anthony Hartman; Herbert Charles Kretschmar, and Andrew John Tofe, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 13, 1975, Ser. No. 540,488

Int. Cl.² A61K *29/00, 43/00;* **G01T** *1/161*

U.S. Cl. 424—1 **11 Claims**

1. A physiologically acceptable, substantially water-insoluble particulate radionuclide carrier comprising an anionic starch derivative comprising from about 1% to about 20% by weight anionic substituents, wherein an average of from about 0.1% to about 1.5%, by weight, of a reducing agent is bound to said starch derivative.

4,002,731

DIAGNOSTIC PROCESS USING SODIUM TYROPANOATE

Thomas W. Skulan, Valatie, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed June 17, 1974, Ser. No. 479,634
Int. Cl.² A61K 29/02, 9/22
U.S. Cl. 424—5 3 Claims

1. A process which comprises administering orally to a mammal possessing a gallbladder, single undivided dose in a sustained or controlled release formulation or intermittently over a period of between about four and about ten hours, an amount of sodium tyropanoate of between about 25 and 100 milligrams per kilogram of body weight of the mammal, whereby a concentration of iodine in the gallbladder sufficient to provide adequate X-ray visualization of the gallbladder is obtained, while maintaining the maximum iodine concentration in the blood significantly lower than the maximum iodine concentration in the blood obtained by oral administration of an initial single dose of the same total amount of sodium tyropanoate.

4,002,732

SPECKLE PARTICLE FOR DENTIFRICE

Ian Ray Gault, Lymm, England, assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 385,296, Aug. 3, 1973, Pat. No. 3,928,555.
This application Sept. 15, 1975, Ser. No. 612,878
The portion of the term of this patent subsequent to Nov. 11, 1992, has been disclaimed.
Int. Cl.² A61K 7/16
U.S. Cl. 424—49 9 Claims

1. An opaque, transparent of translucent toothpaste dentifrice preparation comprising a toothpaste dentifrice base containing about 10–75% by weight of the preparation of a dentally acceptable water-insoluble polishing agent and about 0.15–50% by weight of the preparation of finely divided visible functional particles, which alleviate periodontal sensitivity and bleeding upon application to teeth and gums, having macroscopic size of 100 to 1000 microns, comprising a matrix of meltable binding material which binding material is a C_{12}–C_{22} saturated fatty acid di- or tri-ester of glycercol or ethylene glycol and about 5–10% by weight of anit-irritant compound selected from the group consisting of allantoin, aluminum dihydroxy allantoinate and aluminum chlorohydroxy allantoinate, said meltable binding material having a melting or softening point lower than the decomposition point of said anit-irritant compound, the total amount of said anti-irritant compound being about 0.1–5% by weight of the preparation.

4,002,733

SUNSCREENING COMPOSITIONS

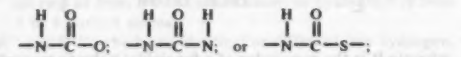
Peter John Degen, Woodbury Township, Washington County, and Anthony James Lucas, Oakdale, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed July 26, 1974, Ser. No. 492,180
Int. Cl.² A61K 7/42
U.S. Cl. 424—59 20 Claims

1. In a sunscreening composition comprising a pharmaceutical extending medium and an effective sunscreening amount of a dermally non-irritating, ultraviolet light-absorbing compound, the improvement wherein the dermally non-irritating, ultraviolet light-absorbing compound is a substantive compound of the formula

$$(XE)_n—R—(AY)_{n^1}$$

wherein R is the aliphatic portion of polymerized 18 carbon fatty acids and contains 36, 54, 72, 90 or 108 carbon atoms; A and E are independently

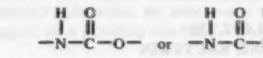


X and Y are aromatic, ultraviolet light absorbing moieties characterized by ultraviolet light absorption maxima in the range of 280 nm to about 360 nm, and when $n + n^1$ is greater than 2, Y may be hydrogen or an alkyl radical containing 1 to 6 carbon atoms; n and n^1 are independently integers from 1 to 6 designating different or the same (XE) and (AY) respectively, except $n + n^1$ must equal 2 - 6.

13. An ultraviolet light-absorbing compound of the formula

$$(XE)_n—R—(AY)_{n^1}$$

wherein R is the aliphatic portion of polymerized 18 carbon fatty acids and contains 36, 54, 72, 90 or 108 carbon atoms; A and E are independently



X and Y are aromatic, ultraviolet light absorbing moieties characterized by ultraviolet light absorption maxima in the range of 280 nm to about 360 nm, and when $n + n^1$ is greater than 2, Y may be hydrogen or an alkyl radical containing 1 to 6 carbon atoms; n and n^1 are independently integers from 1 to 6 designating the same or different (XE) and (AY) respectively, except $n + n^1$ must equal 2–6.

4,002,734

EMOLLIENT HAIR GROOMING COMPOSITION

Melcina H. Pickford, 614 W. Broadway, Minneapolis, Minn. 55411

Continuation-in-part of Ser. No. 410,631, Oct. 29, 1973, abandoned. This application Aug. 7, 1975, Ser. No. 602,663
Int. Cl.² A61K 7/06
U.S. Cl. 424—74 4 Claims

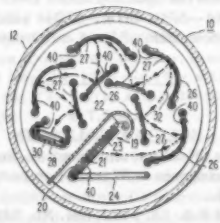
1. An emollient hair grooming composition comprising a blended mixture of about 16 to 20 parts by weight of (A) a mixture consisting essentially of about 6.71% rectified tar oil, 2.43% sulfur, 1% lanolin, 1.53% inerts and 0.32% captan in 88.01% petroleum; about 15 to 19 parts by weight of (B) a mixture consisting essentially of about 10 to 35% by weight of mineral oil, about 5 to 20% each of mineral wax, isopropyl palmitate and beeswax, about 3 to 5% of sulfur, and about 0.1 to 3% each of oxyquinoline and pine oil in 40% to 75% of petroleum jelly containing about 0.1% phenol, to make 100%; and about 14 to 18 parts of (C) castor oil; all blended into about 280 to 400 parts by weight of (D) petroleum jelly.

4,002,735

METHOD OF SENSITIZING ELECTRON EMISSIVE SURFACES OF ANTIMONY BASE LAYERS WITH ALKALI METAL VAPORS

Arthur Frederick McDonie, Lancaster, Pa., and Charles Michael Tomasetti, Turnersville, N.J., assignors to RCA Corporation, New York, N.Y.

Filed June 4, 1975, Ser. No. 583,746
Int. Cl.² H01J 9/22; B05D 5/12
U.S. Cl. 427—78 6 Claims



1. A method of making an electron emissive electrode including a supporting base layer of antimony sensitized with

the vapors of a plurality of alkali metals comprising the steps of:

a. sensitizing the base layer by exposing a surface portion thereof to the vapors of at least two alkali metals at a pressure level of less than 10^{-4} torr and at an initial temperature of less than about 120° C.; then,

b. continuing said exposure of step (a) while gradually increasing said temperature to a final temperature of about 200° C. at an average rate of less than about 10° C. per minute; then,

c. baking the electrode at said final temperature until substantially maximum photosensitivity is achieved.

4,002,736

PORCINE BACTERIN

Duane C. Pankratz, c/o Grand Laboratories, Freeman, S. Dak. 57029

Filed Dec. 16, 1974, Ser. No. 532,771

Int. Cl.² A61K *39/02*

U.S. Cl. 424—92 **16 Claims**

1. A bacterin for prophylactic treatment of the pathologic effects of the bacterium *Streptococcus equisimilus* in swine, which bacterin consists essentially of killed *Streptococcus equisimilus* bacteria suspended in an injectable aqueous medium.

4,002,737

PREVENTION AND/OR TREATMENT OF POISON IVY DERMATITIS

David P. Borris, Oxford, Miss., assignor to Research Corporation, New York, N.Y.

Filed Oct. 15, 1975, Ser. No. 622,520

Int. Cl.² A61K *37/48*

U.S. Cl. 424—94 **10 Claims**

1. A method of treating or preventing poison ivy dermatitis which comprises applying to the skin surface susceptible to or evidencing poison ivy dermatitis an effective amount of enzyme selected from the group consisting of catechol 1,2-oxygenase and catechol 2,3-oxygenase.

4,002,738

TREATMENT OF SPECIFIED NEOPLASIAS

Edwin Samuel Johnson, Antioch, and John Hunter Seely, Lake Forest, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed May 30, 1975, Ser. No. 582,319

Int. Cl.² A61K *37/02*

U.S. Cl. 424—177 **7 Claims**

1. The method of reducing the size of a mammary or DMBA-inducible tumor in a warm-blooded animal by administering to said animal an effective daily amount to reduce the size of said tumor of a nonapeptide of the formula

L-pGlu-L-His-L-Trp-L-Ser-L-Tyr-X-L-Leu-L-Arg-L-Pro-NH-R

wherein X denotes the optically active D-form of an aminoacid of the formula —NH—CHR′—CO— with R′ being a linear or branched carbon chain of 1 – 4 carbon atoms and wherein R is lower alkyl.

4,002,739

SOLUBLE COLLAGEN

James E. Turner, Madison, and James R. Butler, Parsippany, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Feb. 18, 1975, Ser. No. 550,790

Int. Cl.² A61K *37/00;* **C08H** *1/00*

U.S. Cl. 424—177 **13 Claims**

1. A composition of matter for use in measuring blood platelet aggregation comprising a solution of acidic collagen and bovine serum albumin said composition having a pH of between about 3.0 to about 4.5.

4,002,740

THYMOPOIETIN II AND THERAPEUTIC USE THEREOF

Gideon Goldstein, 4421 Douglas Ave., Riverdale, N.Y. 10471, and David H. Schlesinger, c/o Mass. Gen. Hospital, Boston, Mass. 02114

Filed Aug. 21, 1975, Ser. No. 606,654

Int. Cl.² A61K *37/00;* **C07C** *103/52*

U.S. Cl. 424—177 **6 Claims**

1. A polypeptide of the following sequence:

H₂N—Gly—Glu—Gln—Arg—Lys—Asp—Val—Tyr—Val—Gln—Leu—Tyr—Leu—COOH.

4. A therapeutic composition of matter comprising a therapeutically effective amount of the composition of claim 1 in a pharmaceutically acceptable carrier.

4,002,741

MEGLUMINE COMPLEX FUNGICIDAL POLYENE MACROLIDE ANTIBIOTIC COMPOSITIONS AND TREATMENT METHOD

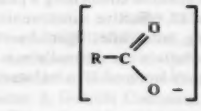
Valter Osvaldovich Kulbakh, Bukharestskaya ulitsa, 86, korpus 1, kv. 85; Tatyana Mikhailovna Kokushina, prospekt Metallistov, 16, kv. 66; Irina Kondratievna Lagert, Moskovskoe shosse, 16, kv. 163; Georgy Avxentievich Mikhailets, ulitsa Lanskaya, 10, kv. 100; Galina Vasilievna Kholodova, ulitsa B. Pushkinskaya, 40, kv. 9; Oleg Nikolaevich Ekzemplyarov, Suvorovsky prospekt, 22b, kv. 14; Ruvim Bentsionovich Zelmanov, ulitsa Chaikovskogo, 13, kv. 20; Leonid Borisovich Sokolov, ulitsa Novorossiskaya, 22, kv. 45; Evgeny Davidovich Etingov, ulitsa Zvezdnaya, 8, kv. 43, and Irina Mikhailovna Lushitskaya, ulitsa Belgradskaya, 42, korpus 2, kv. 26, all of Leningrad, U.S.S.R.

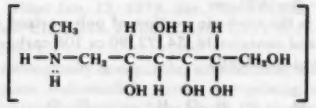
Division of Ser. No. 463,843, April 24, 1974. This application Dec. 4, 1975, Ser. No. 637,827

Int. Cl.² A61K *31/70*

U.S. Cl. 424—180 **26 Claims**

1. A medicinal composition comprising as an active ingredient, a meglumine complex of a fungicidal polyene macrolide antibiotic of the formula:





wherein R is the remainder of a fungicidal polyene macrolide antibiotic having no carboxyl groups.

4,002,742
1-N-ALKYL-4,6-DI-(AMINOGLYCOSYL)-1,3-DIAMINOCYCLITOS, METHODS FOR THEIR MANUFACTURE, METHODS FOR THEIR USE AS ANTIBACTERIAL AGENTS, AND COMPOSITIONS USEFUL THEREFOR

John J. Wright, Orange; Peter J. L. Daniels, Cedar Grove; Alan K. Mallams, West Orange, and Tattanahalli L. Nagabhushan, East Orange, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 452,600, March 19, 1974, abandoned. This application July 30, 1974, Ser. No. 492,998

Int. Cl.² A61K *31/70*

U.S. Cl. 424—180 **47 Claims**

1. A compound selected from the group consisting of a 1-N-X-4,6-di-O-(aminoglycosyl)-1,3-diaminocyclitol selected from the group consisting of 1-N-X-gentamicin A, 1-N-X-gentamicin B, 1-X-gentamicin B_1, 1-N-X-gentamicin C_1, 1-N-X-gentamicin C_{1a}, 1-N-X-gentamicin C_2, 1-N-X-gentamicin C_{2a}, 1-N-X-gentamicin C_{2b}, 1-N-X-gentamicin X_2, 1-N-X-sisomicin, 1-N-X-verdamicin, 1-N-X-tobramycin, 1-N-X-Antibiotic G-418, 1-N-X-Antibiotic 66-40B, 1-N-X-Antibiotic 66-40D, 1-N-X-Antibiotic JI-20A, 1-N-X-Antibiotic JI-20B, 1-N-X-Antibiotic G-52, 1-N-X-mutamicin 1, 1-N-X-mutamicin 2, 1-N-X-mutamicin 4, 1-N-X-mutamicin 5, and 1-N-X-mutamicin 6;

wherein X is an alkyl substituent selected from the group consisting of alkyl, cycloalkylalkyl, alkenyl, aralkyl, hydroxyalkyl, aminoalkyl, alkylaminoalkyl, aminohydroxyalkyl, and alkylaminohydroxyalkyl, said alkyl substituent having up to 8 carbon atoms, the carbon in said alkyl substituent adjacent to the aminoglycoside nitrogen being unsubstituted, and when said alkyl substituent is substituted by both hydroxyl and amino functions, only one of said functions can be attached at any one carbon atom;

and the pharmaceutically acceptable acid addition salts thereof.

4,002,743
MONO- AND DITHIOPHOSPHONIC ACID ESTERS AND THEIR USE AS PESTICIDES

Gerhard Stähler, Frankfurt am Main; Ludwig Emmel, Bergen-Enkheim, and Werner Bonin, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

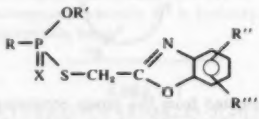
Filed Mar. 18, 1975, Ser. No. 559,643

Claims priority, application Germany, Mar. 18, 1974, 2413008

Int. Cl.² C07D *263/56*

U.S. Cl. 424—200 **16 Claims**

1. A mono- or dithiophosphonic acid ester of the formula



wherein

R is alkyl of from 1 to 4 carbon atoms optionally substituted by halogen, alkoxy of from 1 to 4 carbon atoms, alkylmercapto of from 1 to 4 carbon atoms or phenyl; cycloalkyl of 5 or 6 carbon atoms; phenyl; halophenyl; methylphenyl or methoxyphenyl;

R′ is alkyl of from 1 to 12 carbon atoms optionally substituted by halogen, alkoxy of from 1 to 4 carbon atoms, alkylmercapto of from 1 to 4 carbon atoms or phenyl; alkenyl of from 3 to 5 carbon atoms or cycloalkyl of from 3 to 5 carbon atoms;

R″ and R‴, which are identical or different, are hydrogen, halogen, methyl, methoxy, nitro or trifluoromethyl; and

X is oxygen or sulfur.

2. A composition for combating a parasitic insect, mite or tick, which comprises 1 to 95% by weight of a compound defined in claim 1 and a solid or liquid inert carrier substance, an adhesive, a wetting agent, a dispersing agent or a grinding auxiliary.

3. A method for combating a parasitic insect or mite infesting a crop plant or a parasitic insect, mite or tick living on a livestock animal, which comprises contacting with the surface of said crop plant, to effect deposition on said surface or absorption into said plant, or administering cutaneously to said livestock animal an effective amount of a compound defined in claim 18 introduced in a composition comprising 1 to 95% by weight of said compound and a solid or liquid inert carrier substance, an adhesive, a wetting agent, a dispersing agent or a grinding auxiliary.

4,002,744
0-ETHYL-0-ISO-BUTYL-0-(2,2-DICHLOROVINYL)-THIONO-PHOSPHORIC ACID ESTER

Wilhelm Sirrenberg, Sprockhovel, and Bernhard Homeyer, Opladen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

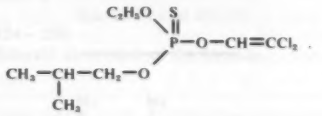
Filed Apr. 9, 1975, Ser. No. 566,647

Claims priority, application Germany, Apr. 24, 1974, 2419624

Int. Cl.² A01N *9/36*; **C07F** *9/165*

U.S. Cl. 424—219 **3 Claims**

1. O-Etyl-O-iso-butyl-O-(2,2-dichlorovinyl)-thiono-phosphoric acid ester of the formula



2. An insecticidal composition containing as active ingredient an insecticidally effective amount of a compound according to claim 1 in admixture with a diluent.

4,002,745
COMPLEMENT INHIBITORS

Seymour Bernstein; Milton David Heller, both of New City, N.Y., and Joseph Peter Joseph, Cliffside Park, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Nov. 18, 1975, Ser. No. 632,932

Int. Cl.² A61K *31/61*, *31/60*

U.S. Cl. 424—230 **15 Claims**

1. A method of inhibiting the complement system in a warm-blooded animal in need of such therapy which comprises internally administering to said animal an effective complement inhibiting amount of a pharmaceutically acceptable compound selected from the group consisting of formaurin dicarboxylic acid, C_1–C_5 acylate thereof, C_1–C_5 alkyl ether thereof, C_1–C_5 alkyl ester thereof, C_1–C_5 acylate of the C_1–C_5 alkyl ester thereof, C_1–C_5 alkyl ether of the C_1–C_5 alkyl ester thereof and salts thereof.

4,002,746
SYNTHESIS OF GON-4-ENES

Gordon Alan Hughes, and Herchel Smith, both of Wayne, Pa., assignors to Herchel Smith, Bryn Mawr, Pa.

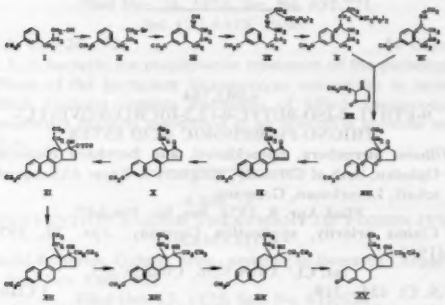
Continuation-in-part of Ser. No. 228,384, Oct. 4, 1962, Pat. No. 3,850,911, which is a continuation-in-part of Ser. Nos. 57,904, Sept. 23, 1960, abandoned, and Ser. No. 91,341, Feb. 24, 1961, abandoned, and Ser. No. 137,535, Sept. 12, 1961, abandoned, and Ser. No. 195,000, May 15, 1962, abandoned, and Ser. No. 196,557, May 16, 1962, abandoned. This application Jan. 15, 1964, Ser. No. 337,823

Claims priority, application United Kingdom, Sept. 25, 1959, 32619/59

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C07J *71/00*

U.S. Cl. 424—243 5 Claims



1. A therapeutic composition having progestational activity comprising as active ingredient a 17-aliphatic carboxylic acid ester of 17α-ethynyl-18-methyl-19-nortestosterone and a pharmaceutical carrier for said compound.

4,002,747
NOVEL ESTER OF 19-NOR-TESTOSTERONE

Johannes van der Vies, Oss, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.

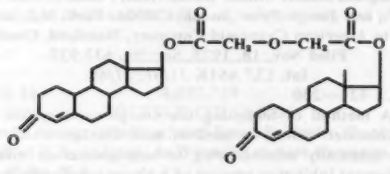
Filed Nov. 24, 1975, Ser. No. 634,391

Claims priority, application Netherlands, Dec. 2, 1974, 7415669

Int. Cl.² C07J *1/00*

U.S. Cl. 424—243 2 Claims

1. The compound, having the formula:



2. A pharmaceutical composition adapted for parenteral administration comprising the compound of claim 1 in a concentration from about 10 to about 50 mg per cc. in a pharmaceutically acceptable liquid carrier.

4,002,748
METHOD OF PREPARING STERILE ESSENTIALLY AMORPHOUS CEFAZOLIN FOR RECONSTITUTION FOR PARENTERAL ADMINISTRATION

Michael Bornstein, and Sandra M. Carone, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Jan. 19, 1976, Ser. No. 650,210

Int. Cl.² A61K *31/54*

U.S. Cl. 424—246 2 Claims

1. A method of preparing a sterile, essentially amorphous cefazolin sodium for reconstitution for parenteral administration comprising the steps of:

a. dissolving said cefazolin sodium in water in a concentration of from about 10 to about 25 percent (W/V);

b. filtering the solution from a) through a sterilizing filter into a previously sterilized container;

c. exposing the preparation from b) to an environment wherein the temperature is from about minus 50° C. to about minus 55° C.;

d. cooling the preparation in the environment of c) to a temperature of minus 48° C. or below and stabilizing for about 30 minutes at such temperature;

e. reducing the pressure of the environment in which the preparation from (d) is maintained to a maximum of 100 microns Hg absolute, and stabilizing such pressure for about 30 minutes;

f. raising the temperature of the environment in which the preparation from (e) is maintained to about 10° C. and holding such temperature until the temperature of such preparation reaches about 5° C., avoiding the melting of such preparation; and

g. raising the temperature of the environment in which the preparation from (f) is maintained to about 35° C. subliming the water from such preparation until the resulting amorphous cefazolin sodium has a moisture content of no more than 6 percent.

4,002,749
SUBSTITUTED INDOLINONES

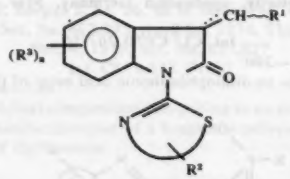
George C. Rovnyak, Hopewell, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 12, 1975, Ser. No. 604,000

Int. Cl.² C07D *417/02*

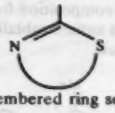
U.S. Cl. 424—246 25 Claims

1. A compound of the formula

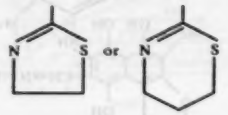


wherein R^1 is selected from the group consisting of phenyl, naphthyl, thienyl, furyl, chlorofuryl, dichlorofuryl, pyrryl, pyridyl, coumarinyl, thiacoumarinyl, thiazolyl, isothiazolyl, imidazolyl, or phenyl or naphthyl substituted with one or more substituents selected from the group consisting of halogen, hydroxy, lower alkyl, nitro, CF_3 and lower alkoxy; R^2 is selected from the group consisting of hydrogen, lower alkyl, phenyl, naphthyl, lower alkylphenyl, or lower alkylnaphthyl; R^3 is selected from the group consisting of hydrogen, lower alkyl, trifluoromethyl, halo, lower alkoxy, nitro, cyano, amino, dilower alkylamino or

wherein R is selected from the groups consisting of lower alkyl, lower alkenyl, phenyl, phenyl-lower alkyl, cycloalkyl, cycloalkenyl, cycloalkyl-lower alkyl, and cycloalkyl-lower alkenyl;



represents a 5- or 6-membered ring selected from the group consisting of



n is 1 or 2; the dotted line ---- represents an optional bond; and pharmaceutically acceptable acid-addition salts thereof.

16. A method for treating inflammation in mammalian species, which comprises administering to the mammalian host a therapeutic amount of a compound as defined in claim 1.

4,002,750

PYRAZINE 4-OXIDE DERIVATIVES AND PROCESS FOR THEIR PREPARATION

Vittorio Ambrogi; Willy Logemann; Marc Antonio Parenti, and Raffaele Tommasini, all of Milan, Italy, assignors to Carlo Erba S.p.A., Milan, Italy

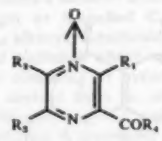
Continuation of Ser. No. 354,909, April 26, 1973, abandoned. This application May 19, 1975, Ser. No. 578,820

Claims priority, application Italy, Apr. 28, 1972, 23663/72

Int. Cl.² C07D *241/24*

U.S. Cl. 424—250 17 Claims

1. A compound of formula (I)



(I)

wherein at least one of R^1, R^2 and R^3 is C_{1-4} alkyl and the others are hydrogen atoms; R^4 is hydroxy or C_{1-4} alkoxy, or a salt of the compound wherein R^4 is hydroxy with a pharmaceutically acceptable base.

4,002,751

5-HYDRAZINOPYRIDAZIN-3(2H)-ONES

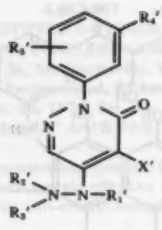
Jerome Linder, Westfield, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 442,748, Feb. 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 409,921, Oct. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 343,889, March 22, 1973, abandoned, which is a continuation-in-part of Ser. No. 291,760, Sept. 25, 1972, abandoned, which is a continuation-in-part of Ser. No. 227,269, Feb. 17, 1972, abandoned, which is a continuation-in-part of Ser. No. 197,401, Nov. 10, 1971, abandoned. This application May 2, 1975, Ser. No. 574,049

Int. Cl.² C07D *237/14*; A61K *31/50*

U.S. Cl. 424—250 12 Claims

1. A compound of the formula:



where X′ is chloro;

R_1' is lower alkyl having 1 to 4 carbon atoms;

R_2' and R_3' are both hydrogen;

R_4' is fluoro, chloro, or trifluoromethyl, and

R_5' is hydrogen fluoro, chloro, or trifluoromethyl;

provided that when R_4' is fluoro or chloro, R_5' is also independently fluoro or chloro and in the position on the ring para to R_4' and that when R_4' and R_5' are both trifluoromethyl, they are on other than an adjacent carbon atom, or a pharmaceutically acceptable acid addition salt thereof.

12. A method of inducing sleep which comprises administering 37.5 to 2000 milligrams of a compound according to claim 1.

4,002,752

PIPERAZINYLIMINO RIFAMYCINS

Renato Cricchio, Varese, and Vittorio Arioli, Como, both of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

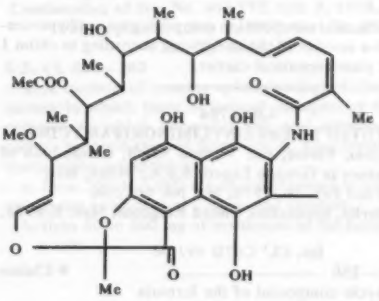
Filed Feb. 26, 1976, Ser. No. 661,587

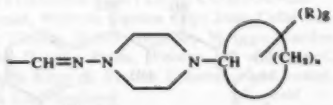
Claims priority, application United Kingdom, Mar. 25, 1975, 10020/75

Int. Cl.³ C07D *491/08*

U.S. Cl. 424—250 8 Claims

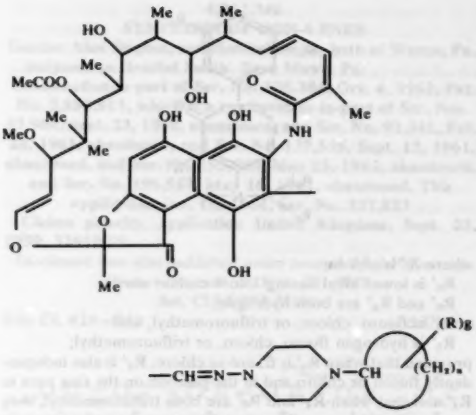
1. A rifamycin compound of the formula





wherein Me represents a methyl group; n represents the integer 3, 4, 5 or 6; g represents the integer 0, 1 or 2; and each R represents a lower alkyl group selected from methyl or ethyl substituting for a hydrogen atom of a $-CH_2-$ group.

8. A pharmaceutical composition for combatting microbial infections containing an antimicrobially effective amount of a compound of the formula



wherein Me represents a methyl group; *n* represents the integer 3, 4, 5 or 6; *g* represents the integer 0, 1 or 2; and each R represents a lower alkyl group selected from methyl or ethyl substituting for a hydrogen atom of a $-CH_2-$ group admixed with a pharmaceutical carrier.

4,002,753

6-SUBSTITUTED 3-CARBETHOXYHYDRAZINOPYRIDAZINES

Carlo Carpi, S.Polo d'EnZa (Reggio Emilia); Luciano Dorigotti, and Giorgio Pifferi, both of Milan, all of Italy, assignors to I.S.F. S.p.A., Milan, Italy

Continuation-in-part of Ser. No. 447,523, March 4, 1974, Pat. No. 3,925,381. This application Sept. 16, 1975, Ser. No. 613,865

Claims priority, application Italy, Mar. 7, 1973, 21297/73

The portion of the term of this patent subsequent to Dec. 9, 1992, has been disclaimed.

Int. Cl.² C07D *237/20;* A61K *31/50*

U.S. Cl. 424—250 **2 Claims**

1. 3-(2-Carbethoxyhydrazino)-6-[N-(2-hydroxypropyl)ethylamino]-pyridazine and its pharmaceutically acceptable salts.

2. Pharmaceutical composition comprising an antihypertensively effective amount of the compound according to claim 1 and an inert pharmaceutical carrier.

4,002,754

SUBSTITUTED PIPERAZINYLIMINORIFAMYCINS

Renato Cricchio, Varese, and Vittorio Arioli, Como, both of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

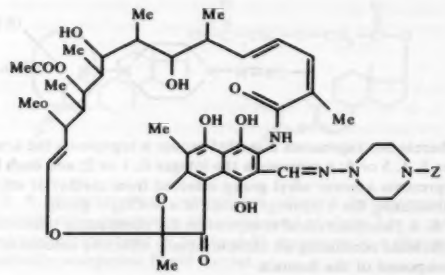
Filed Feb. 26, 1976, Ser. No. 661,586

Claims priority, application United Kingdom, Mar. 5, 1975, 9058/75

Int. Cl.² C07D *491/08*

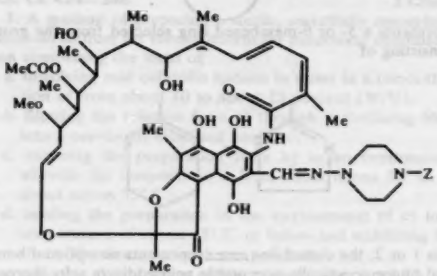
U.S. Cl. 424—250 **9 Claims**

1. A rifamycin compound of the formula



wherein Me represents a methyl group and Z represents alkenyl of 3 to 5 carbon atoms, alkynyl of 3 to 5 carbon atoms, 5- to 7-membered cycloalkenyl, cycloalkyl-(C_1-C_2)alkyl wherein the cycloalkyl moiety is a 3- to 7-membered ring or cycloalkenyl-(C_1-C_2)alkyl wherein the cycloalkenyl moiety is a 5- to 7-membered ring.

9. A pharmaceutical composition for combatting microbial infections containing an antimicrobially effective amount of a compound of the formula



wherein Me represents a methyl group and Z represents alkenyl of 3 to 5 carbon atoms, alkynyl of 3 to 5 carbon atoms, 5- to 7-membered cycloalkenyl, cycloalkyl-(3_1-C_3)alkyl wherein the cycloalkyl moiety is a 3- to 7-membered ring or cycloalkenyl-(C_1-C_2)alkyl wherein the cycloalkenyl moiety is a 5- to 7-membered ring, admixed with a pharmaceutical carrier.

4,002,755

TRIAZOLOQUINAZOLINES

Michihiro Yamamoto; Shigeaki Morooka; Masao Koshiba, all of Nishinomiya; Shigeho Inaba, Takarazuka, and Hisao Yamamoto, Kobe, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

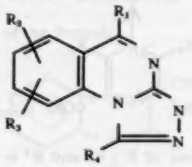
Filed Feb. 25, 1975, Ser. No. 552,889

Claims priority, application Japan, Feb. 27, 1974, 49-24621

Int. Cl.² C07D *487/04*

U.S. Cl. 424—251 **6 Claims**

1. An s-triazolo[4,3-a]quinazoline of the formula



wherein R_1 is C_1-C_4 alkyl, phenyl, halophenyl, C_1-C_4 alkylphenyl or C_1-C_4 alkoxyphenyl; R_2 and R_3 are independently hydrogen, halogen, trifluoromethyl, nitro, C_1-C_4 alkyl or C_1-C_4 alkoxy, or R_2 and R_3 together may form methylenedioxy; and R_4 is hydrogen, C_1-C_4 alkyl, benzyl, phenethyl or halobenzyl; and pharmaceutically acceptable acid addition salts thereof.

4,002,756

USEFUL PRO-DRUG FORMS OF THEOPHYLLINE

Takeru Higuchi; Nicolae S. Bodor, and Yu-Neng Kuo, all of Lawrence, Kans., assignors to Interx Research Corporation, Lawrence, Kans.

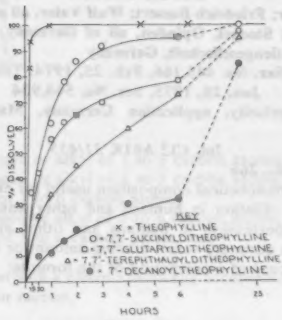
Division of Ser. No. 463,092, April 22, 1974, Pat. No. 3,935,196. This application Sept. 26, 1975, Ser. No. 617,030

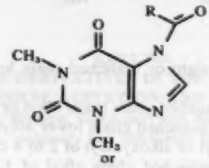
Int. Cl.² A61K *31/52*

U.S. Cl. 424—253 **4 Claims**

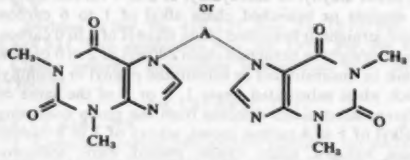
1. A method for inducing a non-toxic, sustained therapeutically effective release of theophylline in the bloodstream of a warm-blooded animal which comprises:

administering thereto, a bronchodilating amount of a prodrug of theophylline of the formula



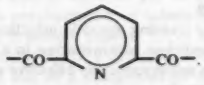

(I)

or


(II)

wherein R represents a member selected from the group consisting of straight or branched C_4–C_{20} alkyl, straight or branched C_4–C_{20} alkenyl, substituted phenyl or a substituted or unsubstituted naphthyl whose substituents are selected from the group consisting of hydroxy, C_1–C_4 alkyl, C_1–C_4 alkoxy, acyloxy derived from an alkanoic acid of up to 4 carbon atoms, chlorine, bromine, and iodine, 2,3,4 pyridyl or quinoline, and wherein A represents a member selected from the group consisting of —CO—, —CO—$(CH_2)_n$—CO— wherein *n* represents an integer of from 1 – 16, —CO—CH=λ CH—CO—(cis or trans),

and

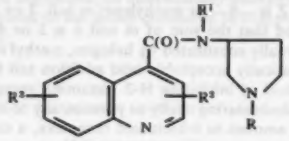


4,002,757
N-(1-SUBSTITUTED-3-PYRROLIDINYL)-4-QUINOLINECARBOXAMIDES

Albert Duncan Cale, Jr., Mechanicsville, Va., assignor to A. H. Robins Company, Incorporated, Richmond, Va.

Filed Dec. 26, 1974, Ser. No. 536,514
Int. Cl.² A61K *31/47*
U.S. Cl. 424—258 **10 Claims**

1. A therapeutic composition suitable for control of emesis comprising (1) an anti-emetic effective amount of between 1.0 and 100 mg. of an anti-emetic compound having the formula:



wherein;

R is lower cycloalkyl,

R^1 is selected from the group consisting of hydrogen, lower-alkyl, phenyl and substituted phenyl wherein the substituents are halogen atoms of atomic weight less than 80, nitro, lower-alkyl, lower-alkoxy or trifluoromethyl,

R^2 is selected from the group consisting of hydrogen, lower-alkyl, halogen of atomic weight less than 80, lower-alkoxy, amino and nitro,

R^3 is selected from the group consisting of hydrogen, lower-alkyl, lower-alkoxy, halogen atom of atomic weight less than 80, amino and nitro, or

pharmaceutically acceptable acid addition salts thereof, and (2) a pharmaceutically acceptable carrier therefor.

4,002,758
MEDICAMENT WHICH IS UTILIZABLE IN OPHTHALMOLOGY

Alphonse Bigóu, Paris, France, assignor to Societe B.F.B., Champigny, France

Continuation of Ser. No. 403,172, Oct. 3, 1973, abandoned. This application July 2, 1975, Ser. No. 592,513
Int. Cl.² A61K *31/44*
U.S. Cl. 424—263 **2 Claims**

1. A method of treating ophthalmological disorders of the cornea in which there is lysis of collagen by the action of collagenase which comprises the oral administration to a patient in need thereof from one to four times a day of a composition comprising:

a. from 200 to 1,000 mg of a compound selected from the group consisting of cystine and cysteine

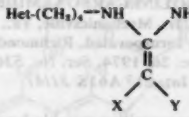
b. from 50 to 300 mg of pyridoxine in the form of a base or a salt.

4,002,759
PYRIDYLBUTYLAMINO ETHYLENE COMPOUNDS

Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote; Charon Robin Ganellin, Welwyn Garden City, and Hunter Douglas Prain, Welwyn, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Continuation-in-part of Ser. No. 468,617, May 9, 1974, Pat. No. 3,953,460. This application Nov. 5, 1975, Ser. No. 629,193
Claims priority, application United Kingdom, May 17, 1973, 23568/73
Int. Cl.² C07D *213/36*; A61K *31/44*
U.S. Cl. 424—263 **9 Claims**

1. A compound of the formula:



wherein X and Y, which may be the same or different, are hydrogen, nitro, cyano or SO_2Ar but are not both hydrogen; Het is a pyridine ring which ring is optionally substituted by lower alkyl, hydroxyl, halogen or amino; R is hydrogen or lower alkyl; Z is —S— or methylene; *m* is 0, 1 or 2 and *n* is 2 or 3 provided that the sum of *m* and *n* is 3 or 4; and Ar is phenyl optionally substituted by halogen, methyl or amino, or a pharmaceutically acceptable acid addition salt thereof.

9. A method of inhibiting H-2 histamine receptors which comprises administering orally or parenterally to an animal, in an effective amount to inhibit said receptors, a compound of claim 1.

4,002,760

TREATMENT OF HUMANS WITH CHOLINESTERASE REACTIVATORS

Albert W. Cook, Centre Island Road, Centre Island, N.Y. 11771

Continuation-in-part of Ser. No. 482,061, June 24, 1974, Pat. No. 3,928,594. This application Nov. 24, 1975, Ser. No. 634,794

The portion of the term of this patent subsequent to Dec. 23, 1992, has been disclaimed.

Int. Cl.² A61K *31/44*

U.S. Cl. 424—263 **2 Claims**

1. Method of alleviating the pain of tic douloureux comprising administering to a person suffering therefrom a dose of 2-formyl-1-methylpyridium oxime or a physiologically acceptable salt thereof effective to alleviate said pain of tic douloureux.

4,002,761

2,3-BIS-(3-LOWER ALKANOYL-2-THIOUREIDO)-PYRIDINES

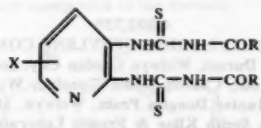
Roger C. Parish, King of Prussia, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 565,026, April 3, 1975, Pat. No. 3,961,063. This application Feb. 10, 1976, Ser. No. 657,016

Int. Cl.² A61K *31/395;* **C07D** *213/53*

U.S. Cl. 424—263 **6 Claims**

1. A compound of the formula:



in which R is lower alkyl; and X is hydrogen, lower alkyl, trifluoromethyl, halo, lower alkoxy, benzoyl, lower alkylthio, lower alkylsulfonyl, phenyloxy or phenylthio.

6. An anthelmintic composition comprising an anthelmintically effective but nontoxic quantity of a compound as claimed in claim 1, dispersed uniformly throughout an inert carier in amounts selected from the range of 1 to 300 mg./kg. per dosage unit.

4,002,762

2-AMINO-3,4-DIHYDROPYRIDINES USED TO EFFECT CORONARY VESSEL DILATION AND TREAT HYPERTENSION

Horst Meyer; Friedrich Bossert; Wulf Vater, all of Wuppertal, and Kurt Stoepel, Opladen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

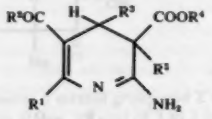
Division of Ser. No. 445,166, Feb. 25, 1974. This application Jan. 28, 1975, Ser. No. 544,934

Claims priority, application Germany, Mar. 3, 1973, 2310747

Int. Cl.² A61K *31/455*

U.S. Cl. 424—266 **34 Claims**

1. A pharmaceutical composition useful for effecting coronary vessel dilation in humans and other animals and for treating hypertension in humans and other animals which comprises a coronary vessel dilating amount or an antihypertensive amount of a compound of the formula:



wherein

R^1 is hydrogen, straight or branched chain lower alkyl, or amino;

R^2 is straight or branched chain lower alkyl or OR′ wherein R′ is straight or branched chain lower alkyl, lower alkenyl, lower alkynyl or alkoxyalkyl of 2 to 4 carbon atoms;

R^3 is straight or branched chain alkyl of 1 to 6 carbon atoms; straight or branched chain alkenyl of 2 to 6 carbon atoms; straight or branched chain alkynyl of 2 to 6 carbon atoms; or unsubstituted or substituted phenyl or naphthyl which when substituted bears 1, 2 or 3 of the same or different substituents selected from the group consisting of alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, halogen, azido, cyano, phenyl, nitro, trifluoromethyl, carbalkoxy of 1 to 4 carbon atoms in the alkoxy moiety and SO_n-alkyl of 1 to 4 carbon atoms in the alkyl moiety wherein *n* is 0, 1 or 2;

R^4 is straight or branched chain alkyl of 1 to 6 carbon atoms, straight or branched chain alkenyl of 2 to 6 carbon atoms, or straight or branched chain alkynyl of 2 to 6 carbon atoms; and

R^5 is straight or branched chain alkyl of 1 to 6 carbon atoms, straight or branched chain alkenyl of 2 to 6 carbon atoms, straight or branched chain alkynyl of 2 to 6 carbon atoms, or benzyl,

in combination with a pharmaceutical acceptable nontoxic inert carrier.

4,002,763

1,2,4-TRIAZOLE ANTIMYCOTIC COMPOSITIONS AND USE THEREOF

Werner Meiser, Wuppertal-Elberfeld; Wolfgang Kramer, Wuppertal-Barmen; Karl Heinz Büchel, and Manfred Plempel, both of Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

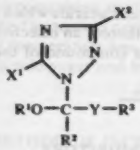
Division of Ser. No. 396,202, Sept. 11, 1973. This application Dec. 12, 1974, Ser. No. 532,191

Claims priority, application Germany, Sept. 26, 1972, 2247186

Int. Cl.² A61K *31/41*

U.S. Cl. 424—269 **18 Claims**

9. A method for treating mycotic infections in humans and animals which comprises administering to a human or animal in need thereof an antimycotically effective amount of a 1,2,4-triazole of the formula



wherein

X^1 is hydrogen or alkyl of 1 to 3 carbon atoms;

X^2 is hydrogen or alkyl of 1 to 3 carbon atoms;

R^1 is alkyl of 1 to 6 carbon atoms;

R^2 is hydrogen or alkyl of 1 to 6 carbon atoms;

R^3 is alkyl of 1 to 6 carbon atoms; and

Y is CO;

in combination with a pharmaceutically acceptable, nontoxic, inert diluent or carrier.

4,002,764

DIAZEPINE DERIVATIVES IN THE TREATMENT OF TENSION, AGITATION AND EPILEPSY

Hans Allgeier, Haagen, Germany, and Andre Gagneux, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

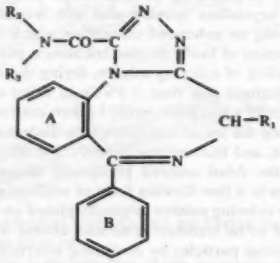
Division of Ser. No. 418,137, Nov. 21, 1973, Pat. No. 3,948,931. This application Nov. 24, 1975, Ser. No. 634,808

Claims priority, application Switzerland, Nov. 28, 1972, 17300/72

Int. Cl.² A61K *31/41*

U.S. Cl. 424—269 **4 Claims**

1. A pharmaceutical preparation useful in the treatment of states of tension, agitation and epilepsy which comprises a diazepine derivative of the general formula I



(I)

wherein R_1 represents hydrogen, R_2 and R_3 each independently represent hydrogen or alkyl having 1 to 6 carbon atoms, ring A is unsubstituted, or substituted in the 8-position by halogen up to atomic number 35, or trifluoromethyl or nitro, and ring B is unsubstituted, or substituted in one o-position by halogen up to atomic number 35, or by trifluoromethyl or a nitro group, or the 5-oxide or a pharmaceutically acceptable acid addition salt of a compound of the formula I, together with an inert pharmaceutical carrier.

4,002,765

2-(NITROMETHYLENE)-1,3-DIAZACYCLOALKANE INSECT CONTROL AGENTS

Charles H. Tieman; Willy D. Kollmeyer, and Steven A. Roman, all of Modesto, Calif., assignors to Shell Oil Company, Houston, Tex.

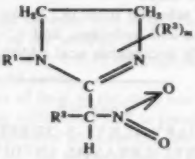
Division of Ser. No. 510,100, Sept. 27, 1974, Pat. No. 3,948,934, which is a continuation-in-part of Ser. No. 412,373, Nov. 1, 1973, abandoned. This application Nov. 7, 1975, Ser. No. 630,068

Int. Cl.² A01N *9/22*

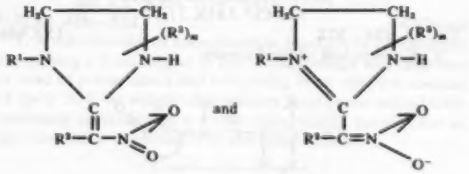
U.S. Cl. 424—273 **7 Claims**

1. An insecticidal composition comprising

a. as active ingredient, an insecticidally effective amount of a compound of the group consisting of compounds of the formula:



derivatives thereof wherein the alpha hydrogen is replaced by middle halogen and resonance hybrids represented by the formulae:



wherein R^1 contains up to eight carbon atoms and is straight-chain alkyl, haloalkyl, alkenyl (middle halo)alkenyl or alkynyl; R^2 is hydrogen, middle halogen or phenylthio optionally substituted by one to two of middle halogen, nitro or alkyl or alkoxy of from 1 to 3 carbon atoms; R^3 is alkyl of 1 to 8 carbon atoms, and *m* is 0 or 1, with the proviso that in said resonance hybrids the R^3 substituent may only replace a hydrogen on a carbon atom in the ring, and (b) an adjuvant therefore.

4,002,766

ANTIARRHYTHMIA METHODS

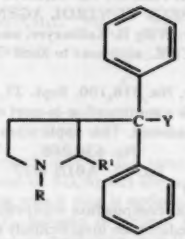
William John Welstead, Jr., Richmond, Va., assignor to A. H. Robins Company, Incorporated, Richmond, Va.

Filed Dec. 26, 1974, Ser. No. 536,708

Int. Cl.² A61K *31/40*

U.S. Cl. 424—274 **5 Claims**

1. A method of controlling cardiac arrhythmias in a mammal suffering therewith which comprises administering to said mammal an antiarrhythmic effective amount of a compound of the formula:



wherein;

R is a member selected from the group consisting of hydrogen, lower alkyl, lower cycloalkyl and phenyllower alkyl,

R′ is a member selected from the group consisting of hydrogen and lower alkyl,

Y is a member selected from the group consisting of carbamoyl, cyano and hydrogen, and

pharmaceutically acceptable acid addition salts thereof.

4,002,767

1-TERTIARY-ALKYL-3-(SUBSTITUTED CYCLOHEXENYL)UREAS AS ANTIHYPERTENSIVE AGENTS

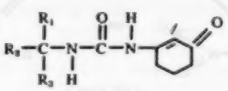
Paul E. Aldrich, Wilmington, Del.; Gilbert H. Berezin, West Chester, Pa., and Bruce I. Dittmar, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 525,445, Nov. 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 461,697, April 17, 1974, abandoned. This application Mar. 11, 1975, Ser. No. 555,308

Int. Cl.² A61K *31/17*

U.S. Cl. 424—322 **15 Claims**

1. A compound of the formula



where

R_1, R_2, and R_3 = C_1–C_3 alkyl, C_2–C_3 alkenyl, or two of R_1, R_2, and R_3 may be joined to form a cycloalkyl or cycloalkenyl group; and its suitable pharmaceutical salts;

provided that the total number of carbon atoms of $R_1 + R_2 + R_3$ does not exceed 5.

4,002,768

PHENYLALKINYL ETHERS

Friedrich Karrer, Basel, and Saleem Farooq, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

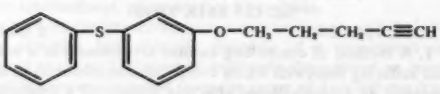
Filed June 27, 1975, Ser. No. 590,761

Claims priority, application Switzerland, July 3, 1974, 9133/74; June 4, 1975, 7215/75

Int. Cl.² C07C *149/32*

U.S. Cl. 424—337 **3 Claims**

1. The compound of the formula



3. A method for combatting insects and acarids which comprises applying thereto or to the locus thereof an insecticidally and acaricidally effective amount of a compound of the formula of claim 1.

4,002,769

INSECT MATURATION INHIBITORS

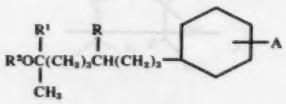
Meyer Schwarz, Kensington; Richard W. Miller, Bowie, both of Md., and James E. Wright, Bryan, Tex., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Continuation-in-part of Ser. No. 498,165, Aug. 16, 1974, abandoned. This application Aug. 1, 1975, Ser. No. 599,731

Int. Cl.² A01N *9/24*; C07C *43/00*

U.S. Cl. 424—339 **16 Claims**

1. A method of inhibiting the eclosion of fly pupae comprising adding to the natural growth media of said pupae from about 0.1 to about 10.0 ppm of a compound of the general formula:



in which A is alkyl having 1 to 5 carbon atoms, alkoxy having 1 to 4 carbon atoms, alkylthio having 1 to 4 carbon atoms, or nitro; R and R^1 are independently methyl or ethyl; and, R^2 is alkyl having 1 to 4 carbon atoms.

4,002,770

MAKING BEVERAGE MIXES AND THE PRODUCT THEREOF

Bartley Norman Wankier, Ontario, Oreg., assignor to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 383,352, July 27, 1973, Pat. No. 3,908,024. This application June 30, 1975, Ser. No. 591,688

The portion of the term of this patent subsequent to Sept. 23, 1992, has been disclaimed.

Int. Cl.² A23L *1/27*

U.S. Cl. 426—72 **10 Claims**

6. The process of preparing an acidified beverage mix contains primarily crystalline sucrose said mix intended to be viewed and having an enhanced coloration which comprises forming a dispersion of finely divided tricalcium phosphate in an aqueous solution of coloring solutes, drying the dispersion to a moisture content less than 0.5%, said dried dispersion being in the form of a frangible, easily broken matrix of coloring solutes having the tricalcium phosphate discretely distributed throughout, and then mixing from 0.05–5.0% by weight of the mix of the dried colored phosphate dispersion with sucrose particles to a free-flowing form of uniform coloration and causing the coloring solutes originally plated on the tricalcium phosphate to be transferred to and adhere on the surfaces of the sucrose particles by continued intermixing of the ingredients.

4,002,771

PROCESS FOR PREPARING A DRY, FLOWABLE SUGAR/FAT COMPONENT AND WHIPPABLE DESSERT COMPOSITION

Gary Arthur Henderson, Cobourg, and Clifford Arthur Allen Dunlop, Richmond, both of Canada, assignors to General Foods Limited, Toronto, Canada

Filed Feb. 6, 1974, Ser. No. 440,109

Int. Cl.² A23L *1/04*; A23G *3/00*

U.S. Cl. 426—103 **9 Claims**

1. A process for preparing a dry, flowable sugar/fat compo-

nent comprising coating said sugar by applying said fat in a melted state onto said sugar whose temperature is maintained at a temperature less than about 25° F while applying the fat onto said sugar and blending the sugar/fat mixture.

4,002,772

METHOD OF INCREASING THE PERMEABILITY OF CELLULAR MATERIALS

Gerhard J. Haas, Woodcliff Lake, N.J., assignor to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 565,370, July 15, 1966, Pat. No. 3,535,126. This application June 22, 1970, Ser. No. 48,560

The portion of the term of this patent subsequent to Oct. 20, 1987, has been disclaimed.

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² A23L *1/31;* **A23C** *3/00*

U.S. Cl. 426—281 **11 Claims**

1. A method of increasing the permeability of cellular food material, without substantially disrupting the cell structure, comprising the steps of:
   a. placing the cellular foodstuff in a pressure vessel,
   b. raising the pressure in the vessel to greater than about 50 p.s.i.g. with a gas selected from the group consisting of methane, carbon monoxide, nitrogen, dichlorodifluoromethane and air, the pressure being sufficient to permeate the cellular material with the gas.
   c. completely freezing said pressurized cellular material at about −20°C. to −25°C., and then
   d. releasing the pressure on the completely frozen cellular material.

4,002,773

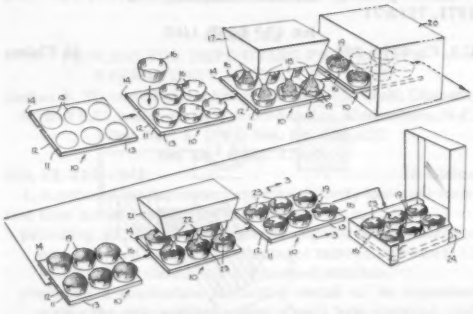
BAKING AND PACKAGING SYSTEM

Charles E. Entenmann, Bayshore, N.Y., assignor to Entenmann's Bakery, Inc., Bayshore, N.Y.

Filed Nov. 21, 1974, Ser. No. 525,958

Int. Cl.² B65B *25/16*

U.S. Cl. 426—302 **5 Claims**



1. A method of cooking and packaging baked goods comprising the steps of:
   providing a shallow tray made primarily of heat resistant nonmetallic material, the tray having an upper level and a lower level spaced below the upper level, the upper level of the tray having a number of spaced openings, and the lower level extending in a plane beneath the openings;
   positioning paper baking liners in the openings in the tray so that the bottoms of the liners are supported by the lower level of the tray, and the sides of the liners are supported circumferentially by the edges of the corresponding openings in the upper level of the tray;
   pouring a predetermined amount of batter into each liner;
   transporting the tray of batter-filled liners to an oven for baking at predetermined temperature conditions for a predetermined time sufficient to fully cook the batter;
   removing the tray of baked goods in the liners from the oven; and
   enclosing the tray of baked goods within a protective delivery and display package, without removing or disturbing the liners in the tray, whereby the individual liners are continuously supported in predetermined spaced relation through the complete process of filling, cooking, and packaging the baked goods, and the cost of reusable metal baking pans is eliminated.

4,002,774

METHOD FOR REMOVING SEEDS FROM PAPAYAS

Harvey T. Chan, Jr., Honolulu, Hawaii, assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Aug. 20, 1975, Ser. No. 605,983

Int. Cl.² A23P *1/00;* **A23N** *4/24*

U.S. Cl. 426—484 **4 Claims**

1. A method for removing the seeds from a papaya, which consists of
   a. cutting off the blossom end of the papaya to expose the blossom end of the seed cavity.
   b. cutting off the stem end of the papaya to expose the stem end of the seed cavity,
   c. applying a jet of fluid to the stem end of the seed cavity, the jet having sufficient force to create a pressure in the seed cavity effective to cause the seeds within the cavity to be blown out the blossom end of the seed cavity.

4,002,775

FATTY ACIDS AND DERIVATIVES AS ANTIMICROBIAL AGENTS

Jon J. Kabara, 2088 Riverwood, Okemos, Mich. 48864

Continuation-in-part of Ser. No. 377,187, July 9, 1973, abandoned. This application May 21, 1975, Ser. No. 579,687

Int. Cl.² A23L *3/34;* **A61K** *31/23, 31/22*

U.S. Cl. 426—532 **4 Claims**

1. A microbicidal of microbiostatic food-grade composition comprising a food subject to microbial spoilage and therefore in need of preservation and containing in an effective amount of up to 30% by weight of a primary food-grade microbicide consisting essentially of a 1 or 2 -mono-laurin polyol ester as the sole active microbicide in the composition.

4,002,776

IMAGING PROCESS EMPLOYING TONER PARTICLES CONTAINING ARYLSULPHONAMIDE FORMALDEHYDE ADDUCT

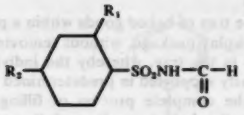
Robert A. Braun, and Robert Mermelstein, both of Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 336,158, Feb. 26, 1973, Pat. No. 3,893,934. This application Jan. 21, 1975, Ser. No. 542,744

Int. Cl.² G03G *9/02*

U.S. Cl. 427—19 **10 Claims**

1. An electrostatographic imaging process comprising the steps of forming an electrostatic latent image on a surface and developing said electrostatic latent image by contacting said electrostatic latent image with an electrostatographic developer material comprising particles, said particles including finely-divided toner material having a particle size of up to about 30 microns, a melting point of at least about 110° F, a melt viscosity of less than about 2.5×10^{-4} poise at temperatures up to about 450° F, said toner material comprising a colorant selected from the group consisting of pigments, dyes, and mixtures thereof, a thermoplastic resin consisting essentially of a vinyl polymer having a melting point of at least about 110° F, and from about 5 percent to about 55 percent by weight, based on the weight of said vinyl polymer, of an arylsulfonamide formaldehyde adduct having a melting point between about 50° F and about 250° F and having the general structure



wherein R_1 and R_2 are either hydrogen or methyl provided that where R_1 or R_2 is methyl, the other is hydrogen, wherein said adduct reduces the melt viscosity of said toner material but does not reduce its glass transition temperature nor its blocking temperature, whereby at least a portion of said particles are attracted to and held on said surface in conformance to said electrostatic latent image.

4,002,777

METHOD OF DEPOSITING ELECTROSTATICALLY CHARGED LIQUID COATING MATERIAL

James W. Juvinall, Sylvania Township, Lucas County, and Erhard Kock, Toledo, both of Ohio, assignors to Ransburg Corporation, Indianapolis, Ind.

Continuation of Ser. No. 677,981, Oct. 25, 1967, abandoned, which is a continuation-in-part of Ser. No. 624,400, March 20, 1967, abandoned. This application Sept. 2, 1969, Ser. No. 849,526

Int. Cl.² B05D *1/06*

U.S. Cl. 427—27 **13 Claims**

1. In a method of depositing liquid coating material on an article in a system in which coating material particles are formed from a thin stream of a liquid body by mechanical force derived from a stream of atomizing air, and in which the liquid body is electrically charged, the improvement comprising the step of adjusting the resistivity of the coating material to be between 0.3 and 300 megohm-centimeters and charging the liquid body to such voltage that at least 95 percent of the current carried to the article is borne by the charged coating material particles and not more than 5 percent of the current is air-borne.

4,002,778

CHEMICAL PLATING PROCESS

Harold E. Bellis, and Donald E. Booker, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 388,648, Aug. 15, 1973, abandoned. This application Dec. 15, 1975, Ser. No. 641,134

Int. Cl.² C23C *3/02*

U.S. Cl. 427—98 **20 Claims**

1. A process for plating nickel or cobalt by chemical reduction of a plating bath onto the surface of an electrically conducting material which is normally non-catalytic to the plating bath, said material selected from the group (measured by weight) consisting of

copper and copper-based alloys containing at least 50% copper,

iron-based alloys containing at least about 50% iron and 12% chromium,

an iron-based alloy containing about 29% nickel, 17% cobalt, and the balance essentially iron,

silver,

a sintered, fritted composition of oxide powders and at least one metal selected from the group consisting of gold, silver, platinum, and alloys containing at least 50% of one or more of such metals,

tin oxide compositions containing a small but effective amount of antimony oxide compositions to increase electrical conductivity, and

a composition consisting essentially of molybdenum, manganese and oxygen,

which process consists essentially of contacting the surface prior to said plating with a pretreating solution consisting essentially of water and a reducing agent selected from the group consisting of alkali metal borohydrides, alkali metal cyanoborohydrides, and amine boranes, said solution containing at least about 0.5 grams per liter of said reducing agent, and then contacting the surface with the plating bath to cause the chemical reduction of nickel or cobalt onto the surface, provided that when the reducing agent in the pretreating solution is an alkali metal borohydride, an alkali metal borohydride is also used as reducing agent in the plating bath.

4,002,779

PROCESS FOR THE MANUFACTURE OF ELECTROCONDUCTIVE NON-WOVEN FABRICS

Ehrenfried Nischwitz, Oberreifenberg, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 23, 1975, Ser. No. 580,162

Claims priority, application Germany, May 24, 1974, 2425196

Int. Cl.² B05D *5/12*; C23C *3/02*

U.S. Cl. 427—124 **3 Claims**

1. A process for the manufacture of electroconductive, non-woven fabrics which comprises the steps of (a) cleaning a non-woven fabric with a polar organic solvent, (b) sensitizing the fiber surfaces of the fabric with an aqueous hydrochloric acid solution of tin-II chloride, (c) rinsing the fabric with water, (d) activating the fiber surfaces with an aqueous hydrochloric acid solution of palladium chloride, (e) again rinsing the fabric with water, and (f) treating the sensitized and activated fiber surfaces of the non-woven fabric with a mixture of an aqueous tenside-free dispersion of an organic polymeric binder and a metastable aqueous metal salt solution to deposit said metal on said fiber surfaces.

4,002,780

METHOD AND DEVICE FOR COATING PLASTICS FILM

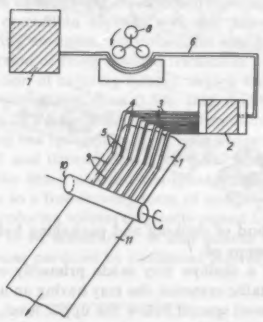
Grahame Melvin Reade, Wheathampstead, and Alan Charles Viney, Welwyn Garden City, both of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation-in-part of Ser. No. 235,718, March 17, 1972, abandoned. This application Sept. 16, 1974, Ser. No. 506,544

Claims priority, application United Kingdom, Mar. 26, 1971, 7910/71

Int. Cl.² B05D *1/40*

U.S. Cl. 427—209 **10 Claims**



1. A method of coating tubular plastics film in lay-flat form comprising depositing on each side of the external surface of the tubular film a plurality of lines of a flowable material capable of forming a coating, passing each side of the external surface with the deposited material over a roller rotating contrary to the direction of travel of the film, and applying sufficient pressure between the roller and the said side of the film surface to spread and merge the material to cover the said side, and subsequently causing or allowing the resulting coating to form a solid coating.

4,002,781
PROCESS FOR MAKING CARRIER SHEETS CONTAINING HARDENABLE POLYESTER RESINS

Jurgen Fock, Essen-Bredeney, and Ulrich Holtschmidt, Essen, both of Germany, assignors to Th. Goldschmidt AG, Germany

Filed Dec. 28, 1971, Ser. No. 213,225
Claims priority, application Germany, Jan. 7, 1971, 2100376; Nov. 26, 1971, 2158679
Int. Cl.² B05D 3/10
U.S. Cl. 427—340 **14 Claims**

1. A process for making carrier sheets containing hardenable polyester resins by treating the carrier sheets with solutions or emulsions of polyester resins, which comprises

a. impregnating the carrier sheet with an aqueous solution of a hardenable water-soluble polyester resin,

b. substantially drying the carrier sheet containing the aqueous solution of the hardenable polyester resin,

c. applying a polymerizable unsaturated compound as a cross-linking agent onto the resin-containing carrier sheet in a quantity sufficient for subsequent cross-linking,

d. coating the treated resin-containing carrier sheet with a solution or an aqueous dispersion of a water-insoluble hardenable polyester resin containing a cross-linking agent, and

e. substantially drying the resultant product of the process.

12. A process for making carrier sheets containing hardenable polyester resins by treating the carrier sheets with solutions or emulsions of polyester resins,

which comprises

a. impregnating the carrier sheet with an aqueous solution of a hardenable water-soluble polyester resin containing at least one unetherified melamine-formaldehyde precondensate in a weight ratio of 0.5 – 1.5 to 1.5 – 0.15,

b. substantially drying the carrier sheet containing the aqueous solution of the hardenable polyester resin,

c. coating the treated resin-containing carrier sheet with a solution or an aqueous dispersion of a water-insoluble hardenable polyester resin containing a cross-linking agent, and

d. substantially drying the resultant product of the process.

4,002,782
PROCESS FOR DEPOSITING PROTECTIVE REFRACTORY METAL COATINGS

Joshua B. Warner, Spartanburg, and James S. Wolf, Clemson, both of S.C., assignors to Warner-London, Greensboro, N.C.

Filed Nov. 1, 1974, Ser. No. 520,422
Int. Cl.² C23C 17/00
U.S. Cl. 427—345 **30 Claims**

1. A process for depositing upon a relatively low wear resistant base metal a refractory metal comprising;

providing an electrolyte material capable of dissociation into ions, and having a conductance ratio of between 0.13 and 0.93 calculated at a 0.1 normal solution,

providing a particulate refractory metal to be deposited within the near-surface region of said base material, said refractory metal having a melting point of at least 1490° C,

admixing 99 to 50% by weight of said refractory metal and 1 to 50% by weight of said electrolyte for a sufficient time to form a nascent surface on at least a portion of each said refractory metal particles to be deposited and at least partially surrounding said refractory metal particles with said electrolyte,

maintaining a moisture content in said mixture sufficient to maintain a resistivity of said electrolyte of less than about 10^6 ohm-centimeters of said admixture, forming a refractory metal ion concentration of 1–20,000 mg. per liter of solution,

contacting and at least partially coating the surface of said base material with said refractory metal in particulate form and said electrolyte admixture,

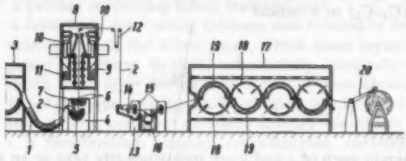
reacting said admixture with said base material at temperatures between 0° C and 200° C, and

depositing said refractory metal within the near-surface region of said base material in the form of discrete particles, whereby to provide a protective surface for said base material.

4,002,783
PROCESS FOR THE PRODUCTION OF TEXTILE MATERIAL LENGTHS CONTAINING BONDING AGENTS

Heinz Fleissner, Egelsbach near Frankfurt am Main, Germany, assignor to Vepa AG, Switzerland

Continuation of Ser. No. 287,831, Sept. 11, 1972, abandoned. This application Nov. 4, 1974, Ser. No. 520,949
Claims priority, application Germany, Feb. 6, 1970, 1905746
Int. Cl.² B05D 3/00, 3/04, 3/02
U.S. Cl. 427—335 **11 Claims**



1. A process for the production of a textile material length containing latex bonding agents for the production of synthetic leather which comprises impregnating the textile material with a thermo-sensibilized latex bonding agent, heating said textile material impregnated with said bonding agent contact-free to a temperature at which the bonding agent coagulates, said latex bonding agent coagulating before drying of said impregnated textile material takes place, washing said textile material impregnated with said bonding agent to remove excess thermo-sensibilizing agent therefrom, subsequently mechanically removing a substantial portion of water from the textile material containing the coagulated latex bonding agent, and thereafter drying and curing the bonding agent within the textile material by drawing a heated gas through said textile material, the passage of said gas through said textile material also increasing the airpermeability of said impregnated textile material.

4,002,784
COATING METHOD FOR GRAPHITE

John G. Banker, Kingston, and Cressie E. Holcombe, Jr., Knoxville, both of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Nov. 6, 1975, Ser. No. 629,245
Int. Cl.² B05D 7/22; B22C 3/00
U.S. Cl. 427—385 R **3 Claims**

1. A method of limiting adverse carbon contamination in metals from graphite ware used in melting said metals, comprising coating said graphite ware with a suspension comprising Y_2O_3 in a suspending solution consisting of water and an effective suspending amount of sodium carboxymethylcellulose.

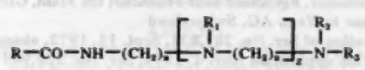
4,002,785

ORGANIC COMPOUND

Marcel Grossmann, Reinach, and Richard Hochreuter, Oberwil, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Continuation-in-part of Ser. No. 446,055, Feb. 26, 1974, abandoned. This application Aug. 22, 1975, Ser. No. 606,929
Claims priority, application Switzerland, Feb. 27, 1973, 2812/73
Int. Cl.² B05D *3/02*; B32B *27/06*
U.S. Cl. 427—389 16 Claims

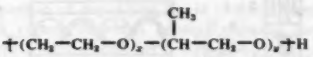
1. A method of producing a non-woven fabric which comprises impregnating a non-woven fibrous web with a migration inhibitor of the formula:



wherein

R is alkyl (C_5–C_{21}), alkenyl (C_5–C_{21}) or alkyl (C_5–C_{21}) or alkenyl (C_5–C_{21}) substituted by hydroxy or containing an oxo group,

R_1, R_2 and R_3 are each, independently, hydrogen, alkyl (C_1–C_3) or a radical



wherein each of *x* and *y* are independently zero or an integer 1 to 60, the sum of each of the integers *x* and *y* in the molecular of the compound of formula I being an integer 1 to 60,

n is an integer 2 or 3 and

Z is zero or an integer 1 to 3, in free base, acid addition salt or quaternary ammonium salt form, and with an aqueous dispersion of a synthetic resin binder, and heating the impregnated web to cause coagulation of the binding agent and to effect drying.

4,002,786

METHOD FOR ELECTROLESS COPPER PLATING

Hyogo Hirohata, Neyagawa; Masahiro Oita, Kashiwara, and Katsuhiko Honjo, Kadoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 314,549, Dec. 13, 1972, abandoned, which is a continuation-in-part of Ser. No. 153,106, June 14, 1971, abandoned, which is a continuation-in-part of Ser. No. 767,502, Oct. 14, 1968, abandoned. This application Apr. 18, 1975, Ser. No. 569,176
Claims priority, application Japan, Oct. 16, 1967, 42-67082; Oct. 27, 1967, 42-69769
Int. Cl.² C23C *3/02*
U.S. Cl. 427—430 A 6 Claims

1. A method for electroless copper plating comprising providing an electroless copper plating bath which comprises

0.005 to 0.3 mole per liter of a water soluble copper salt,

0.005 to 0.6 mole per liter of ethylenediaminetetraacetate as a complexing agent for cupric ions,

0.02 to 3.0 mole per liter of formaldehyde,

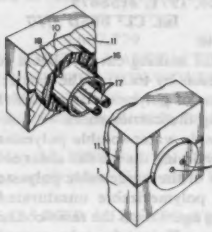
0.05 to 1000 milligrams per liter of 2,2′-dipyridyl and an alkaline compound to maintain the pH of said aqueous solution to between 10.5 and 14 and immersing a material having catalytic action at the surface into said electroless copper plating bath composition maintained at a temperature of 70° to 90° C whereby a copper film having a high mechanical strength is deposited on said material.

4,002,787

FOAMED POLYMERIC ARTICLE AND METHOD FOR MAKING THE SAME

Richard L. Bailly, Beechwood Circle, Boxford, Mass. 02132

Filed June 24, 1974, Ser. No. 482,340
Int. Cl.² B29C *27/02*; B29D *23/00*, *27/00*; B65D *9/10*
U.S. Cl. 428—35 12 Claims



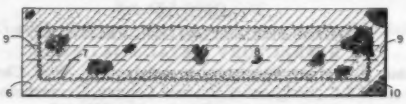
1. Article of manufacture of a desired shape comprising a sheet of foamed polymeric thermoplastic material having at least a pair of edges in abutting engagement, said article having a surface layer having a density greater than the density of the interior of said foamed material, said surface layer being fused at said pair of abutting edges to form a bond therebetween, said abutting edges being unbonded inwardly from said surface layer.

4,002,788

TWO-PHASE MATERIAL OF CONCRETE AND POLYMER AND ITS METHOD OF PREPARATION

James L. Lott, Champaign, Ill., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 193,495, Oct. 28, 1971. This application Oct. 7, 1975, Ser. No. 620,474
Int. Cl.² B32B *3/02*
U.S. Cl. 428—70 4 Claims



3. A two-phase material having thermal insulating and structural stress bearing capabilities comprising:

a. a foamed masonry material having opposed surfaces and a dispersed foam void volume of 50–65 per cent of the volume of said material;

b. a region adjacent each of said opposed surfaces including polymer impregnated interconnected foam voids; and

c. a core region of unimpregnated foam voids and masonry material between said regions adjacent each of said opposed surfaces.

4. A structure as recited in claim 3 including reinforcing means in the regions defined by the polymer impregnated interconnected foam voids.

4,002,789

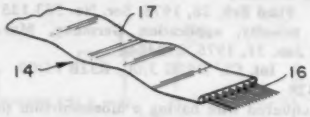
ENDLESS REINFORCEMENT

Norman E. Klein, Inman, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.

Filed Jan. 10, 1974, Ser. No. 432,162
Int. Cl.² B32B *5/12*; B60C *9/12*; B29H *17/02*
U.S. Cl. 428—108 6 Claims

1. An endless reinforcement comprising at least one unitary strip positioned across the width of the reinforcement from

one side to the other at an angle to the edges of the reinforcement in a zigzag pattern, said unitary strip including a multiplicity of continuous filaments surrounded and separated by rubber and disposed in contiguous transversely undulating



relationship in the major plane of said strip and throughout said strip, said strip being between one-half inch and two inches in width with at least one-half an undulation per inch throughout the length of said strip.

4,002,790

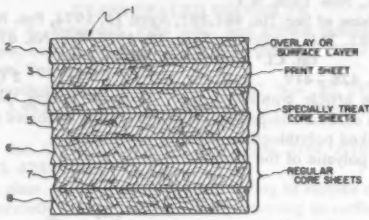
POSTFORMABLE LAMINATE

Carl E. Trewiler, Coshocton, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 294,682, Oct. 3, 1972, abandoned. This application Sept. 6, 1974, Ser. No. 503,822

Int. Cl.² B32B *7/02;* **B29D** *9/06*

U.S. Cl. 428—212 **5 Claims**



1. A decorative plastic laminate, characterized by improved postformability render heat, comprising a plurality of paper core sheets, all of said core sheets being resin-impregnated, and an overlying print sheet, at least one of said core sheets next to the print sheet of said laminate, but not all of said core sheets, being specially resin-impregnated to a greater resin content than the other resin-impregnated core sheets to render the fibers in said specially resin-impregnated core sheets less yielding to postforming stresses relative to those of the other resin-impregnated core sheets to reduce failure of the surface of said laminate when said laminate is postformed.

5. The process of providing readily heat postformable decorative plastic laminates comprising a plurality of resin-impregnated paper core sheets all of which are resin-impregnated and a superimposed print sheet thereon which comprises resin-impregnating at least one of the core sheets next to the print sheet, but not all of said core sheets, to a greater resin content than the other resin-impregnated core sheets to render said specially resin-impregnated core sheet less yielding than the other core sheets when said laminate is postformed.

4,002,791

BELT COATED WITH POLYURETHANE COMPOSITION CONTAINING CELLULOSIC PARTICLES

John M. Sawyer, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 17, 1976, Ser. No. 658,433

Int. Cl.² B32B *5/16, 27/04, 27/40;* **B64F** *1/02*

U.S. Cl. 428—260 **3 Claims**

1. A woven fabric belt having a coating of polyurethane on each face and extending through interstices of the fabric, the polyurethane comprising the reaction product of a polypropylene ether glycol, 4,4′-methylene di(cyclohexylene isocyanate) cured with p,p′-methylene dianiline and at least one face of said belt contains said polyurethane having walnut shell powder incorporated therein.

4,002,792

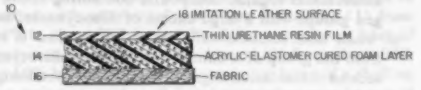
IMITATION LEATHER MATERIAL AND METHOD OF PREPARING SUCH MATERIAL

Richard E. Petersen, Concord, Mass., and Jitendra J. Modi, North Bergen, N.J., assignors to Pandel-Bradford, Inc., Lowell, Mass.

Filed Dec. 11, 1974, Ser. No. 531,464

Int. Cl.² D06N *3/08;* **B32B** *3/26*

U.S. Cl. 428—310 **18 Claims**



1. A sheet laminate material suitable for use as a shoe-upper material, which laminate material comprises:

a. a thin, flexible, organic, polymer, top skin layer;

b. a flexible supporting fabric material; and

c. a foam layer intervening between and bonded to the top skin layer and the fabric layer, which foam layer comprises a resilient, flexible, substantially open-cell, polymeric foam layer having a thickness of from about 5 to about 30 mils, and which foam layer has been derived from a latex composition which consists essentially of

i. a film-forming, organic, cross-linkable, carboxylated polymer,

ii. a water-soluble, long-chain, free, acidcontaining, partially neutralized, acrylate polymer in a thickening amount of from about 2 to 10 phr,

iii. a methylol cross-linking agent in an amount sufficient to cross-link the organic film-forming carboxylated polymer and the acidic acrylate polymer, and

iv. the latex composition having an acidic pH and a foamable viscosity.

4,002,793

7-METHYL-2-BENZOFURAN CARBOXALDEHYDE

Max Winter, Petit-Lancy; Fritz Gautschi, Commugny; Ivon Flament; Max Stoll, both of Petit-Lancy, all of Switzerland, and Irving M. Goldman, Niantre, Conn., assignors to Firmenich & Cie, Geneva, Switzerland

Division of Ser. No. 482,695, June 24, 1974, Pat. No. 3,917,871, which is a division of Ser. No. 243,866, April 13, 1972, abandoned, which is a division of Ser. No. 70,560, Sept. 8, 1970, Pat. No. 3,702,253, which is a continuation of Ser. No. 543,069, April 18, 1966, abandoned, which is a continuation-in-part of Ser. No. 452,342, April 30, 1965, abandoned. This application June 6, 1975, Ser. No. 584,688

Int. Cl.² C07D *307/80*

U.S. Cl. 260—346.2 R **1 Claim**

1. The compound 7-methyl-benzofuran-2-aldehyde.

4,002,794

ADHESIVE MATERIAL AND ARTICLES INCORPORATING SAME

Andor Schwarcz, Niskayuna, N.Y., assignor to Nashua Corporation, Nashua, N.H.

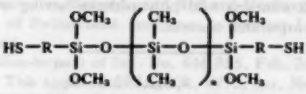
Filed July 18, 1975, Ser. No. 597,080

Int. Cl.² B32B *9/00*

U.S. Cl. 428—352 **15 Claims**

1. Release agent comprising the reaction product of a composition comprising in admixture:

a. a di (omega-organofunctional) dimethylsiloxane oligomer represented by the formula:



wherein R is an olefin hydrocarbon radical having at least two carbon atoms and n is an integer from 5 to 100;

b. a difunctional organic compound capable of reacting with the active hydrogen of the terminal groups of the dimethylsiloxane oligomer selected from the group consisting of aromatic and aliphatic diisocyanates and diisocyanate prepolymers resulting from the reaction of a difunctional organic compound containing active hydrogen groups with a large excess of diisocyanate; and

c. when said difunctional organic compound is selected from the group of aromatic and aliphatic diisocyanates, a second difunctional organic compound containing active hydrogen groups.

4,002,795

CRIMPED YARNS AND METHOD FOR MAKING THEM

Gerard Barbe, St Didier au Mont d'Or; Robert Habault, Lyon, and Jean-Louis Tamet, Besancon, all of France, assignors to Rhone-Poulenc-Textile, France

Continuation of Ser. No. 454,285, March 25, 1974, abandoned. This application Aug. 29, 1975, Ser. No. 608,978

Claims priority, application France, Mar. 26, 1974, 74.11046

Int. Cl.² D02G *3/00, 3/02*

U.S. Cl. 428—370 **3 Claims**

1. A crimped yarn having a substantially cylindrical appearance and comprising bi-component organic polymer filaments, each filament possessing an elongated cross-section, the position of the interface between the components in the cross-section varying from one filament to the other but remaining substantially the same throughout the length of the filament, whereby the yarn is formed from at least two filament types, one of said filament types having an interface which is substantially disposed along or parallel to the smaller axis and another of said filament types having an interface which is disposed along or parallel to the larger axis of the cross-section of the filament.

4,002,796

CONDITIONING OF POLYOLEFINIC FIBERS FOR USE IN THE MANUFACTURE OF SYNTHETIC PAPER

Luciano Baldi, Turin, and Emilio Martini, Bologna, both of Italy, assignors to Montedison Fibre S.p.A., Milan, Italy

Filed Jan. 10, 1975, Ser. No. 540,164

Claims priority, application Italy, Jan. 11, 1974, 19329/74

Int. Cl.² D06M *15/08*

U.S. Cl. 428—375 **7 Claims**

1. In the process of rendering polyolefin fibers having a surface area greater than 1 m^2/g dispersible in water which comprises treating said polyolefin fibers with an aqueous solution of a hydrophilic polymer, the improvement characterized in that the hydrophilic polymer is a condensation product of polyvinyl alcohol with an aliphatic aldehyde having from 1 to 6 carbon atoms which condensation product contains, in the macromolecule, from 2 to 8 aldehyde residues per 100 vinyl monomeric units.

4,002,797

LUBRICANT FOR WIRES WITH ENAMELED OR LACQUERED INSULATION

Heinz Hacker, Nurnberg, and Ernst Helwig, Bad Neustadt, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Feb. 26, 1975, Ser. No. 553,125

Claims priority, application Germany, Mar. 1, 1974, 2409979; Jan. 31, 1975, 2504044

Int. Cl.² D02G *3/00;* B32B *15/00*

U.S. Cl. 428—378 **9 Claims**

1. A lacquered wire having a lubricant film thereon; said lubricant having an ointment or soap-like consistency at room temperature and having a melting point between about 35° and 65° C comprising a compound of the formula A-C-B wherein A is a chemical grouping, having at least one ethylenically unsaturated group or having at least one reactive hydrogen atom which permit chemical incorporation into a polymerizable impregnating resin system; B is a saturated or unsaturated aliphatic hydrocarbon radical having from 8–24 carbons, and C is a binding member in the form of a divalent radical containing an element selected from the group consisting of carbon, nitrogen, oxygen and sulfur.

4,002,798

CURABLE POLYENE-POLYTHIOL COMPOSITIONS

Charles R. Morgan, Brookeville, Md., assignor to W. R. Grace & Co., New York, N.Y.

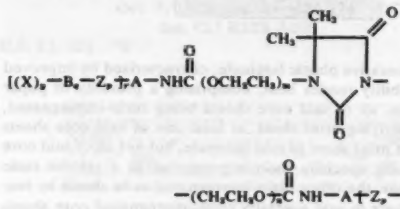
Division of Ser. No. 461,207, April 15, 1974, Pat. No. 3,945,982. This application Sept. 18, 1975, Ser. No. 614,575

Int. Cl.² B32B *27/06;* B05D *3/06*

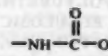
U.S. Cl. 428—419 **2 Claims**

1. An article comprising two substrates having therebetween a curable composition which on curing becomes a solid crosslinked polythioether adhesive comprising

1. A polyene of the formula:



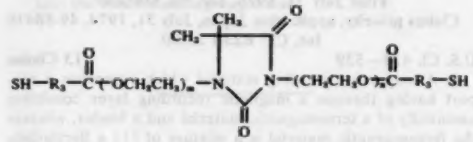
wherein A and B are polyvalent organic radical members free of reactive carbon to carbon unsaturation and are independently selected from the group consisting of aryl, substituted aryl, aralkyl, substituted aralkyl, cycloalkyl, substituted cycloalkyl, alkyl and substituted alkyl containing 1 to 36 carbon atoms and mixtures thereof, said group members can be connected by a chemically compatible linkage selected from the group consisting of —O—, —S—, carboxylate, carbonate, carbonyl, urethane and substituted urethane, urea and substituted urea, amide and substituted amide, amine and substituted amine and hydrocarbon; Z is a divalent chemically compatible linkage selected from the group consisting of



—O— and —S—; X is a member selected from the group consisting of (a) $-(CH_2)_d-CR'=CHR$, (b) $-O-(CH_2)_d-CR'=CHR$, (c) $-S-(CH_2)_d-CR'=CHR$, (d) $-(CH_2)_d-C$ CR, (e) $-O-(CH_2)_d-C$ CR, (f) $-S-(CH_2)_d-C$ CR; and mixtures thereof; where R and R′ each are

independently selected from the group consisting of hydrogen and methyl radicals; *d*, *p* and *q* are each integers from 0 to 1; *m* and *n* are each integers of at least 1; with $m + n$ from 2 to 22 and *r* at least 1, and *y* from 1 to 10; and

2. A polythiol of the formula:



wherein *m* and *n* are each at least 1 and $m + n$ is 2 to 22 and R_3 is a polyvalent organic radical member free of reactive carbon-to-carbon unsaturation and is selected from the group consisting of aryl, substituted aryl, aralkyl, substituted aralkyl, cycloalkyl, substituted cycloalkyl, alkyl and substituted alkyl groups containing 1 to 16 carbon atoms and mixtures thereof, the total combined functionality of (a) the reactive carbon to carbon bonds per molecule in the polyene and (b) the thiol groups per molecule in the polythiol being greater than 4.

4,002,799

GLASS SEALED PRODUCTS

Maurice E. Dumesnil, Palo Alto, and Ulrich Schreier, San Mateo, both of Calif., assignors to Technology Glass Corporation, Sunnyvale, Calif.

Continuation-in-part of Ser. No. 418,247, Nov. 23, 1973, Pat. No. 3,963,505. This application Feb. 17, 1976, Ser. No. 658,660

Int. Cl.² B32B *17/06*; **C03C** *27/00, 3/14, 3/10*

U.S. Cl. 428—428 **7 Claims**

4. A glass, metal or ceramic body having its surface covered by a hermetic sealing coat formed by covering its surface with a mixture comprised of a finely divided solder glass selected from the group consisting of lead-boron glasses and zinc-lead-boron glasses in which the zinc oxide:lead oxide mol ratio is below 1:2 and a finely divided oxygen containing zinc material selected from the group consisting of zinc silicate, zinc zirconium silicate, zinc oxide, zinc aluminate, zinc zirconate, zinc stannate, zinc zirconium aluminum silicate and mixtures thereof, the zinc material being present in an amount in the range 3 to 30% by weight of the total mixture, heating the thus covered body to a temperature at which the covering mixture softens and wets the body surface, holding the body at such temperature for several minutes and then cooling it to ambient temperature.

4,002,800

IMPREGNATION OF MASONRY HAVING A NEUTRALLY OR ACIDLY REACTION SURFACE

Heinz Nestler, Niederkassel-Ranzel; Jürgen Amort, Troisdorf, and Leo Hans Plankl, Recklinghausen, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Division of Ser. No. 418,627, Nov. 23, 1973, Pat. No. 3,879,206. This application Apr. 5, 1974, Ser. No. 458,488

Claims priority, application Germany, Dec. 1, 1972, 2258901

Int. Cl.² B32B *9/04*

U.S. Cl. 428—447 **14 Claims**

1. In a process of contacting masonry with an alcoholic or hydrocarbonaceous solution of an alkyltrialkoxysilane or a partial condensation product thereof, the improvement which comprises including in said solution as an additive a composition selected from the group consisting of an organofunctional silane having a basic organo group and an alcoholate of silicon, a metal of the First Main Group of the Periodic System, a metal of the Second Main Group of the Periodic System, a metal of the Fourth Sub-Group of the Periodic System or a metal of the Fifth Sub-Group of the Periodic System.

4,002,801

HEAT SEALABLE ARTICLES TREATED WITH VINYL HALIDE POLYMER LATICES

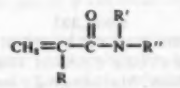
Donald P. Knechtges, Grafton, and Bela K. Mikofalvy, Avon Lake, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Continuation of Ser. No. 341,996, March 16, 1973, abandoned. This application Jan. 15, 1975, Ser. No. 541,133

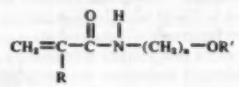
Int. Cl.² B32B *27/06, 27/34*

U.S. Cl. 428—474 **8 Claims**

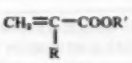
1. A heat-sealable article comprising a substrate coated or impregnated with an overpolymer latex containing (1) from about 10% to about 90% by weight of the overpolymer latex of a core polymer of polyvinyl chloride, and (2) from about 90% to about 10% by weight of the overpolymer latex of a shell on said core polymer, said shell being overpolymerized on said core polymer and containing, in polymerized form, one or more polymerizable monomers selected from the group consisting of (a) α,β-olefinically unsaturated carboxylic acids containing from 2 to 12 carbon atoms; (b) amides having the formula



wherein R is hydrogen or an alkyl group containing from 1 to 4 carbon atoms and R′ and R″ are hydrogen or an alkyl group containing from 1 to 8 carbon atoms; (c) N-alkylol and N-alkoxyalkyl amides having the formula



wherein R is hydrogen or an alkyl group containing from 1 to 4 carbon atoms, R′ is hydrogen or a hydrocarbon radical containing from 1 to 12 carbon atoms, and n is an integer from 1 to 4; and (d) esters of acrylic acid and methacrylic acid having the formula



wherein R is hydrogen or a methyl group and R′ is an alkyl radical containing from 1 to 12 carbon atoms and wherein said shell contains at least one monomer selected from (c), said heat-sealable article being curable at temperatures substantially below 300° F. without the use of curing agents and being substantially free of discoloration.

4,002,802

PHOTOGRAPHIC SUBBING COMPOSITION HAVING IMPROVED ANCHORAGE

John H. Bayless, Kendall Park, and Harold Carl Arvidson, Princeton Junction, both of N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 12, 1975, Ser. No. 612,729

Int. Cl.² B05D *3/00*; **B32B** *27/08, 27/30, 27/36*

U.S. Cl. 428—483 **10 Claims**

1. A process of coating a dimensionally stable, hydrophobic, biaxially oriented thermoplastic resin film with an aqueous

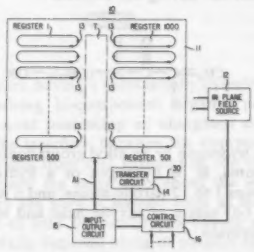
emulsion of a polymer containing from 35 to 96 weight percent vinylidene chloride, from 3.5 to 64.5 weight percent of an alkyl acrylate wherein the alkyl group contains from 1 to 10 carbon atoms, an alkyl methacrylate wherein the alkyl group contains from 1 to 10 carbon atoms, acrylonitrile, methacrylonitrile, vinyl chloride, or combinations thereof and from 0.5 to 25 weight percent of a carboxylic acid containing from 3 to 10 carbon atoms and having one carbon - carbon ethylenically unsaturated double bond wherein said dispersion has an initial pH of from about 2 to about 5 and which process comprises treating said dispersion with an anionic exchange resin sufficiently to raise the pH of the dispersion to above about 7.5, applying the thus treated dispersion to the film and drying the coated dispersion.

4,002,803

MAGNETIC BUBBLE DEVICES WITH CONTROLLED TEMPERATURE CHARACTERISTICS

Stuart Lawrence Blank, Madison, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 25, 1975, Ser. No. 607,379
Int. Cl.² G11C *11/14*; G11B *5/00*
U.S. Cl. 428—539 **8 Claims**



1. A magnetic bubble device comprising

a. a substrate supporting at least a first layer of an iron containing garnet possessing an uniaxial magnetic anisotropy perpendicular to the layer, which layer is capable of supporting magnetic bubbles which are stable and of a characteristic diameter in a temperature varying bias field over a temperature range, which anisotropy is predominantly a growth induced anisotropy produced by dodecahedral site substitution, which bias field is produced by a magnet adapted for maintaining the layer in the bias field throughout the temperature range, which bias field is less than a bubble collapse field at each temperature within the temperature range, and which bias field varies throughout the temperature range at an average rate, Δ;

b. generating means for generating the bubbles; and

c. propagating means for moving the bubbles in order to produce information processing characterized in that the iron garnet contains at least one member of the group consisting Lu, Yb, or Tm in octahedral sites, in a total relative molar concentration of from 0.01 to 0.2 per formula unit, such that the bubble collapse field of the garnet varies with temperature throughout the temperature range at an average rate of approximately Δ.

4,002,804

MAGNETIC RECORDING MATERIAL

Goro Akashi; Masaaki Fujiyama; Nobutaka Yamaguchi; Satoru Takayama, and Koji Sasazawa, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed July 31, 1975, Ser. No. 600,689
Claims priority, application Japan, July 31, 1974, 49-88416
Int. Cl.² B23B *15/00*
U.S. Cl. 428—539 **13 Claims**

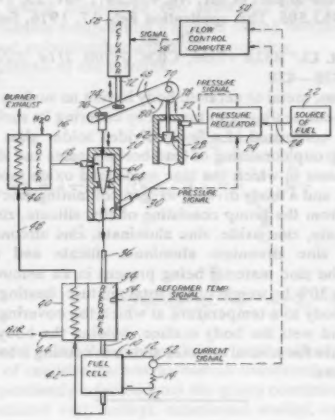
1. A magnetic recording material which comprises a support having thereon a magnetic recording layer consisting essentially of a ferromagnetic material and a binder, wherein the ferromagnetic material is a mixture of (1) a Berthollide iron oxide having a particle size of about 0.5 μ or larger and a degree of oxidation represented by the value of x in FeO_x of $1.33 < x \leqq 1.45$ and (2) a Berthollide iron oxide having a particle size of about 0.4 μ or smaller and a degree of oxidation represented by the value of x in FeO_x of $1.43 \leqq x < 1.50$, where the weight ratio of Berthollide iron oxide (1) to Berthollide iron oxide (2) ranges from about 1:4 to 4:1.

4,002,805

METHOD AND APPARATUS FOR CONTROLLING THE FUEL FLOW TO A STEAM REFORMER IN A FUEL CELL SYSTEM

Elliot I. Waldman, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 20, 1975, Ser. No. 633,992
Int. Cl.² H01M *8/06*
U.S. Cl. 429—17 **8 Claims**



1. In the method of regulating the feed flow of steam and fuel to reforming apparatus in a fuel cell system including a variable area ejector having a metering orifice as a part thereof, fuel supply means in communication with said ejector for supplying a gaseous fuel to said ejector, said fuel supply means including a fuel flow control valve, said valve having a metering orifice as a part thereof, said fuel reforming apparatus being downstream of said ejector, said apparatus including a steam reformer, and a fuel cell downstream of said apparatus for receiving reformed fuel from said apparatus, the steps of:

introducing steam into the ejector as the primary flow thereof including controlling the rate of steam flow into said ejector by varying the area of said metering orifice of said ejector;

introducing a gaseous fuel into said ejector as the secondary flow thereof for mixing with the steam therein including controlling the rate of fuel flow into the ejector by (1) passing said fuel through said valve, (2) maintaining a constant pressure drop across said valve, and (3) varying,

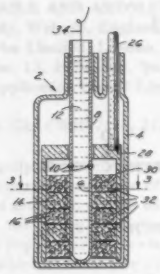
in response to the fuel requirements of said fuel cell, the area of said metering orifice of said valve simultaneously with the step of varying the area of said metering orifice of said ejector and in a manner which provides the desired ratio of fuel to steam for all steam flow rates; and conveying the mixture of fuel and steam from said ejector into the fuel reforming apparatus.

4,002,806

SECONDARY BATTERY OR CELL

Nirmal K. Gupta, Plymouth, and Frank A. Ludwig, Southfield, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 20, 1975, Ser. No. 605,943
Int. Cl.² H01M 43/00
U.S. Cl. 429—104 **13 Claims**



1. In a secondary battery or cell comprising:

A. one or more anodic reaction zones containing a molten alkali metal reactant-anode in electrical contact with an external circuit;

B. one or more cathodic reaction zones containing (i) a cathodic reactant which, when the battery or cell is at least partially discharged, is selected from the group consisting of (a) single phase composition comprising a molten polysulfide salt of said anodic reactant and (b) a two phase composition comprising molten sulfur and molten sulfur saturated polysulfide salts of said anodic reactant and (ii) an electrode of porous conductive material which is at least partially immersed in said cathodic reactant, and

C. a cation - permeable baarrier to mass liquid transfer interposed between and in contact with said anodic and cathodic and cathodic reaction zones, said porous conductive material being in electrical contact with both said cation -permeable barrier and an external circuit,

wherein the improvment comprises increasing the charge/discharge capacity of said battery or cell by including in said cathodic reactant between about 0.001 and about 10 weight percent based on the total weight of the cathodic reactant of and additive selected from the group consisting of:

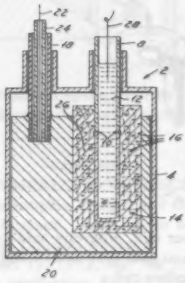
i. metals selected from the group consisting of
   a. metals from Groups I, II and III of the Periodic Table of Elements, (b) Transition Series Metals, and (c) antimony, lead, tin and bismuth;
ii. alloys comprising metals of (i);
iii. salts of metals of (i);
iv. oxides of metals of (i);
v. phosphides, arsenides, antimonides, carbides and nitrides of the metals of (i); and
vi. mixtures of (i) through (v).

4,002,807

ALKALI METAL, SULFUR BATTERY OR CELL WITH SINGLE PHASE SULFUR ELECTRODE

Frank A. Ludwig, Southfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sept. 30, 1975, Ser. No. 618,171
Int. Cl.² H01M 43/00
U.S. Cl. 429—104 **7 Claims**



1. In a secondary battery or cell comprising:

A. One or more anodic reaction zones containing a molten sodium reactant-anode in electrical contact with an external circuit;

B. one or more cathodic reaction zones containing (i) a cathodic reactant which, when the battery or cell is at least partially discharged, is selected from the group consisting of (a) a molten sodium polysulfide salt and (b) a composition comprising molten sulfur and molten sulfur saturated sodium polysulfide salts and (ii) an electrode of porous conductive material which is at least partially immersed in said cathode reactant, and

C. a solid electrolyte which is a cation-permeable barrier to mass liquid transfer interposed between and in contact with said anodic and cathodic reaction zones, said porous conductive material being in electrical contact with both said cation-permeable barrier and an external circuit,

wherein the improvement comprises increasing the charge/discharge capacity of said battery or cell by dissolving in said cathodic reactant an additive selected from the group consisting of: (1) arsenic and phosphorus; (2) polysulfide salts of arsenic and phosphorus; and (3) mixtures of (1) and (2), said additive being dissolved in such an amount that said cathodic reactant contains between about 5 and about 25 atom percent of arsenic and/or phosphorus based on the total atoms of said additive element or elements and sulfur in said reactant.

4,002,808

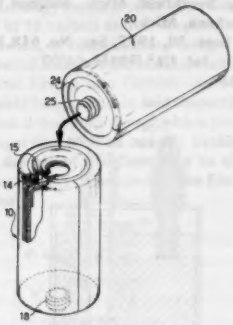
ELECTROCHEMICAL CELL

Jean Fafa, Paris, France, assignor to Compagnie Industrielle des Piles Electriques "Cipel", Levallois Perret, France

Filed Feb. 18, 1975, Ser. No. 550,748
Claims priority, application France, Feb. 26, 1974, 74.06468
Int. Cl.² H01M 6/42
U.S. Cl. 429—157 **15 Claims**

1. Electrochemical cell comprising a casing having two opposite ends, a metal electrode cup constituting one of the electrodes of said cell and having a closed bottom located inwardly of an end of said casing, a terminal of first polarity for another electrode of said cell projecting ouwardly from the other end of said casing and a second terminal of opposite polarity comprising socket means fixed to the closed end of said electrode cup externally thereof, and thus being isolated from the interior of said electrode cup, said socket means comprising a deformable disc including a portion that will receive and cooperatively engages with the pin-like member of another cell like said cell so and to connect said two cells electrically and also fix them to each other, said second terminal having a substantially plane surface constituting a portion of the first-named end of said casing of said cell with no part

of said disc protruding outwardly from said plane surface until said disc is tightly engaged and deformed outwardly by the pin



member of another cell, whereby said cell maybe stood on said plane surface at said first named end prior to being connected to said another cell.

4,002,809

METHOD OF MANUFACTURING ACRYLIC FIBERS

Ko Kozuka, Takasago; Shunichiro Kurioka, Kobe; Taizo Yasumoto; Shigeru Kobayashi, both of Akashi; Atsuo Kubota, Takasago, and Nobumasa Otoshi, Kobe, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 169,474, Aug. 5, 1971, abandoned. This application Apr. 9, 1973, Ser. No. 348,917

Claims priority, application Japan, Dec. 2, 1970, 45-107307; Dec. 7, 1970, 45-107602; Dec. 7, 1970, 45-107603

Int. Cl.² C08K *5/00*; D01F *6/18*

U.S. Cl. 526—4 **6 Claims**

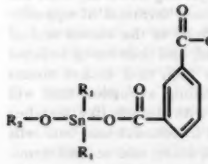
1. Method of manufacturing acrylic fibers comprising the steps of

A. dissolving in an organic solvent one of the following resins

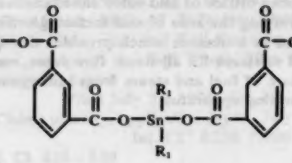
1. a copolymer consisting essentially of
   a. 30 to 80 weight percent acrylonitrile, and
   b. 70 to 20 weight percent vinyl chloride or vinylidene chloride, or
2. a tripolymer consisting essentially of
   a. 30 to 80 weight percent acrylonitrile,
   b. 70 to 20 weight percent vinyl chloride or vinylidene chloride, and
   c. 3 weight percent or less ethylenically unsaturated monomer having a hydrophilic group;
3. adding one or more compounds from the group consisting of

1. a tin compound represented by the following formulas (I) or (II)

(I)



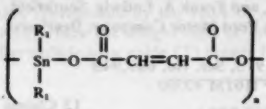
(II)



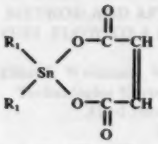
(wherein R_1 represents alkyl group having 2 to 8 carbon atoms and R_2 represents alkyl group having 1 to 12 carbon atoms), and

2. a tin compound represented by the following formulas: (III), (IV) or (V)

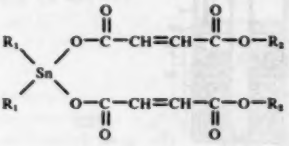
(III)



(IV)



(V)



(Wherein R_1 represents alkyl group having 2 to 8 carbon atoms and R_2 represents alkyl group having 1 to 12 carbon atoms, and n denotes a positive integer); and

C. spinning the resulting spinning solution in first and second baths comprising one or more solvents in concentrations of less than 60 weight percent and 61 to 85 weight percent, respectively.

4,002,810

PROCESS FOR INSERTION OF HEXAFLUOROPROPENE AT THE ALIPHATIC CARBON-HYDROGEN BOND OF A POLYOLEFIN

Robert Neville Haszeldine, Disley, and Ronald Rowland, Warrington, both of England, assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 321,161, Jan. 5, 1973, Pat. No. 3,917,725. This application Jan. 2, 1975, Ser. No. 537,977

Claims priority, application United Kingdom, Jan. 14, 1972, 1988/72

Int. Cl.² C08F *8/18*

U.S. Cl. 526—22 **8 Claims**

1. A polymer product comprising a fluorinated, substantially non cross-linked polyolefin selected from the group consisting of polyethylene, polypropylene, polyisobutylene, polystyrene and ethylene-propylene copolymers, said polyolefin having from about 0.1 to about 60%, based on the weight of said polymer product, of pendant groups having the following formula:

4,002,811

PRODUCTION OF UNIFORM COPOLYMER OF ACRYLONITRILE AND AROMATIC OLEFINES

Brian Norman Hendy, Welwyn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Dec. 13, 1974, Ser. No. 532,687

Claims priority, application United Kingdom, Dec. 20, 1973, 59054/73

Int. Cl.² C08F 2/20, 212/10

U.S. Cl. 526—59 5 Claims

1. A suspension polymerization process for the batchwise production of a uniform copolymer of acrylonitrile and at least one conjugated aromatic olefine having a faster reaction rate selected from the group consisting of styrene, α-methyl styrene and mixtures thereof containing 50 to 95% molar of acrylonitrile units which method comprises polymerising the monomers in aqueous suspension and feeding a portion of at least the faster reacting aromatic olefine to the reaction mixture so as to produce said uniform copolymer wherein polyvinyl pyrrolidone having a Fikentscher K value of at least 60 is employed as suspension agent.

4,002,812

PRODUCTION OF UNIFORM COPOLYMER OF ACRYLONITRILE AND AROMATIC OLEFINES

Brian Norman Hendy, Welwyn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Dec. 13, 1974, Ser. No. 532,688

Claims priority, application United Kingdom, Dec. 20, 1973, 59053/73

Int. Cl.² C08F 2/20, 212/10

U.S. Cl. 526—59 4 Claims

1. A suspension polymerization process for the batchwise production of a uniform copolymer of acrylonitrile and at least one conjugated aromatic olefine having a faster reaction rate selected from the group consisting of styrene and α-methyl styrene, said copolymer containing 50 to 95% molar of acrylonitrile units, which method comprises polymerising the monomers in aqueous suspension and feeding a portion of at least the faster-reacting aromatic olefine to the reaction mixture so as to produce said uniform copolymer wherein the suspension agent employed is hydroxyethyl cellulose which has M.S. of 1.5 to 3.5, D.S. of 1.0 to 3.0, and Brookfield viscosity (measured on a 1% by weight aqueous solution at 25° C) of 500 to 5000 cps and wherein M.S. is the average number of moles of ethylene oxide incorporated into each anhydroglucose unit and D.S. is the average number of groups per anhydroglucose unit which are substituted.

4,002,813

INJECTION OF CATALYSTS INTO A POLYMERIZATION AUTOCLAVE

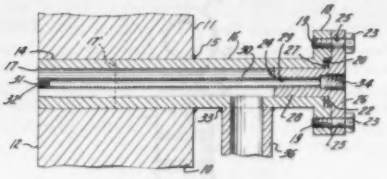
Robert Bruce Steinert, Staten Island, N.Y., and William Arthur Schuessler, Rivervale, N.J., assignors to Dart Industries Inc., Los Angeles, Calif.

Filed Aug. 16, 1974, Ser. No. 497,977

Int. Cl.² C08F 2/00, 10/02

U.S. Cl. 526—61 7 Claims

1. In a continuous process for conducting polymerization reactions under high pressure with the aid of a free-radical generating catalyst in an enclosed reaction space, the improvement which comprises releasing a highly pressurized fine liquid jet of catalyst internally into a separate compressed stream of monomer just as said stream of monomer discharges



into said enclosed reaction space from its entry port through the enclosure wall surrounding said reaction space.

4,002,814

POLYMERIZATION PROCESS

Eric Jones; John Christopher Padget, and Geoffrey Alan Cole, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 11, 1975, Ser. No. 557,378

Claims priority, application United Kingdom, Mar. 11, 1974, 10686/74

Int. Cl.² C08F 4/02, 10/02

U.S. Cl. 526—154 11 Claims

1. A process for the copolymerization of ethylene with one or more other mono α-olefins in which the monomers are contacted with an initiator composition which is the product of reacting an organo-metallic compound of general formula R_mMX_p with finely divided alumina which is free from adsorbed water, where M is a metal of Group IVA, R is a hydrocarbyl group, and X, when present, is a singly charged anionic ligand or a monodentate neutral ligand and m and p are integers, m having a value from 2 to 4 and n having a value from 0 to 2 the sum of m and p being not more than 4, is characterised in that the said organo-metallic compound has a purity ratio of at least 500/1, wherein said organometallic is prepared by reaction of a Group IV A metal halide with a Group I-III metal hydrocarbyl compound; wherein said purity ratio is defined as the molar ratio of the Group IV A metal to Group I to III metal in the Group IVA organometallic.

4,002,815

CYCLOPENTENE-DICYCLOPENTADIENE COPOLYMERS AND METHOD OF MAKING SAME

Robert J. Minchak, Parma Heights, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 412,956, Nov. 5, 1973, which is a continuation-in-part of Ser. No. 337,392, March 2, 1973, Pat. No. 3,853,830. This application Apr. 3, 1975, Ser. No. 564,774

Int. Cl.² C08F 210/00, 212/00

U.S. Cl. 526—283 4 Claims

1. A copolymer comprising cyclopentene, dicyclopentadiene and from about 0.01 to about 0.3 mole of at least one nonconjugated acyclic olefin polymerized therewith per mole of total cyclopentene and dicyclopentadiene monomer, said nonconjugated acyclic olefin having at least one hydrogen on each double-bonded carbon atom and 2 to 12 carbon atoms, and said dicyclopentadiene being present in an amount from about 55% to about 98% by weight of the total weight of copolymer.

4,002,816

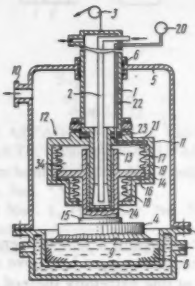
DEVICE FOR MEASURING MASS OF CONSUMABLE ELECTRODES BEING REMELTED IN ELECTRIC FURNACES

Anatoly Dmitrievich Zhupakhin, ulitsa Teatralnaya, 4, kv. 45; Gennady Ivanovich Prokoshev, Shosse Metallurgov, 53a, kv. 206, both of Chelyabinsk; Boris Konstantinovich Karavashkin, ulitsa Nevezhina, 15, kv. 25, Kurgan; Felix Iosifovich Shved, ulitsa B. Khmelnitskogo, 18, kv. 21, Chelyabinsk; Rashat Faskheevich Maksutov, prospekt Lenina, 77, kv. 38, Chelyabinsk; Evgeny Fedorovich Gavrilin, Shoose Metallurgov, 53a, kv. 217, Chelyabinsk; Vasily Andreevich Mushenkov, Trudovaya ulitsa, 17a, kv. 35, Chelyabinsk; Anatoly Borisovich Sergeev, Teatralnaya ulitsa, 4a, kv. 26, Chelyabinsk; Alexandr Fedorovich Shkapa, Elektrostalskaya ulitsa, 47, kv. 71, Chelyabinsk, and Lev Alexandrovich Zhivichkin, ulitsa 3 Sputnika, 3a, kv. 56, Chelyabinsk, all of U.S.S.R.

Filed Aug. 4, 1975, Ser. No. 601,703

Int. Cl.² H05B 7/148; F27D 11/10

U.S. Cl. 13—12 16 Claims



1. A device for measuring the mass of electrodes being remelted in electric furnaces, comprising: a hollow cooled rod; a mass transmitter for the consumable electrode secured on said rod; a casing of said mass transmitter; a bar with an annular projection acting as a movable element of said mass transmitter and arranged in said casing; two bellows of different diameter disposed in said casing one above the other along the axis of said bar and functioning as a sensitive element of said mass transmitting; opposing near ends of said bellows being secured on the projection of said bar; remote ends of said bellows being secured on said casing; said annular projection having a working surface by means of which it interacts with said bellows; the spaces of said bellows defined by the bellows proper, by said casing and said annular projection being in communication with one another; a liquid filling said spaces of said bellows, variations in the pressure thereof being indicative of the mass of said consumable electrode; a recess provided on the end face of said bar and accommodating an end face of said rod; a current-conducting liquid medium filling said recess; and a holder of said consumable electrode rigidly associated with the other end face of said bar.

4,002,817

GAS CABLE WITH COMPRESSION TYPE PULLING ASSEMBLY

Costabile DeGrado, Elmwood Park, N.J., assignor to The Okonite Company, Ramsey, N.J.

Filed Dec. 31, 1975, Ser. No. 645,532

Int. Cl.³ H02G 1/00, 15/22

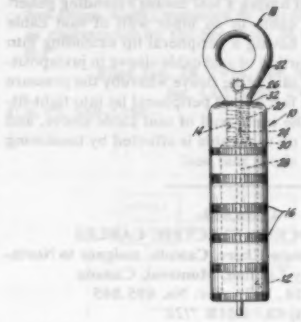
U.S. Cl. 174—10 5 Claims

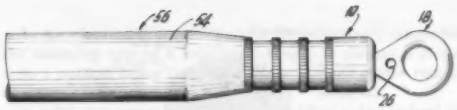
1. A multiconductor, gas-filled cable wherein a compression type pulling assembly is attached to the end of the cable, wherein the improvement comprises:

a. a pulling eye having gas passageway means extending generally longitudinally therethrough;

b. a shell member having a first terminal end connected with said pulling eye and having a second terminal end receiving said multiconductor, gas-filled cable; and

c. a tube connected to said gas passageway means of the pulling eye, extending longitudinally through the interior





of said shell, and entering said multiconductor cable, for communicating gas from said gas passageway means to the interior of said multiconductor, gas-filled cable.

4,002,818

LIPPED CABLE ENTRY SEAL FOR PRESSURIZED SLEEVE

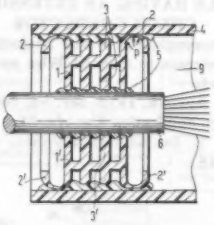
Dieter Kunze, Neuried, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 25, 1975, Ser. No. 599,307

Claims priority, application Germany, July 25, 1974, 7425454

Int. Cl.² H02G 15/24, 15/18

U.S. Cl. 174—21 R 6 Claims



1. A cable sleeve entry seal adapted to position and seal at least one cable passing therethrough and to contain pressurized gas about said cable and within a cable sleeve thereabout comprising:

a lip member extending radially outwardly and longitudinally inwardly from a longitudinally inward radial sealing surface of said entry seal and engageable with an inner surface of said sleeve, the lip being sealed against said sleeve surface by gas pressure thereon from within said sleeve and inwardly of said seal;

a coating of plastic sealing compound applied to an inner surface of said sleeve and to an outer surface of said cable; and

at least two longitudinally-spaced, radially inwardlyextending sealing elements engaging said cable surface via said sealing compound coated on said cable surface.

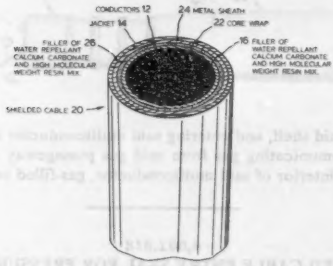
4. A pressurized cable sleeve seal having a cable extending therethrough, the seal being divided longitudinally and fitting tightly on said cable and having a seal means extending generally radially from said cable to an inner wall of said cable sleeve, said seal means having a peripheral lip extending into a pressurized interior portion of said cable sleeve in juxtaposition to said inner wall of said cable sleeve whereby the pressure within said cable sleeve forces said peripheral lip into tight-fitting engagement with the inner wall of said cable sleeve, and the tight fit of said seal on said cable is effected by tensioning band circumferentially about said seal.

4,002,819

WATER BLOCKED ELECTRIC CABLES

Leo Victor Woytiuk, Pointe-Claire, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

Filed June 14, 1976, Ser. No. 695,845
Int. Cl.² H01B 7/28
U.S. Cl. 174—23 C **10 Claims**


CONDUCTORS 12
JACKET 14
24 METAL SHEATH
22 CORE WRAP
FILLER OF 26 WATER REPELLANT CALCIUM CARBONATE AND HIGH MOLECULAR WEIGHT RESIN MIX
16 FILLER OF WATER REPELLANT CALCIUM CARBONATE AND HIGH MOLECULAR WEIGHT RESIN MIX
SHIELDED CABLE 20

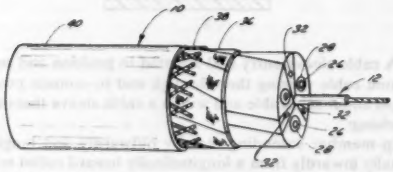
1. An electric cable having a core of a plurality of insulated conductors and a jacket, the interstices between the conductors and within the jacket being at least partially filled with a mixture of water repellant treated calcium carbonate and at least one high molecular weight resin rapidly hydratable to form a viscous solution.

4,002,820

POWER CABLE HAVING AN EXTENSIBLE GROUND CHECK CONDUCTOR

Zvi Panin, Scarborough, and Walter Shakotko, Toronto, both of Canada, assignors to Canada Wire and Cable Limited, Toronto, Canada

Filed Apr. 16, 1975, Ser. No. 568,529
Claims priority, application Canada, May 3, 1974, 198848
Int. Cl.² H01B 9/00
U.S. Cl. 174—115 **19 Claims**



1. A power cable comprising three insulated power conductors helically stranded together, at least two grounding conductors located in the interstices between the power conductors and an extensible ground check conductor also located in the interstices between the power conductors, said ground check conductor including:

a. a plurality of metallic wire strands helically wound together in a short lay and in the same direction of lay; and

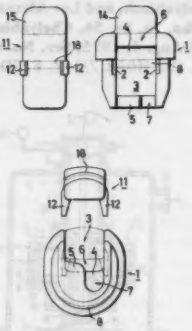
b. extensible non-metallic material separating said metallic wire strands for substantially eliminating direct friction between the metallic wire strands during flexing and twisting of the cable.

4,002,821

STRAIN RELIEF GROMMET

Sei'ichi Satoh, and Kazuo Sekiguchi, both of Yokohama, Japan, assignors to Nifco Inc., Tokyo, Japan

Filed June 24, 1976, Ser. No. 699,814
Claims priority, application Japan, June 27, 1975, 50-89946
Int. Cl.² H01B 17/26; H01R 13/58; F16L 5/00
U.S. Cl. 174—153 G **3 Claims**



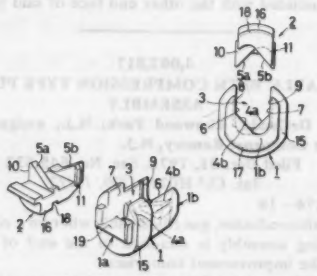
1. A grommet, comprising a female member having a U-shaped end face and possessing a U groove adapted to pass a cord and provided at one extremity thereof with an elevating wall rising from the bottom of said groove and at the other extremity thereof with a projecting wall extending inwardly from one side wall and a male member adapted to be brought into engagement with said female member downwardly from above said U groove, whereby the engagement of said male and female members creates a laterally elongate opening at the extremity containing said elevated wall and a longitudinally elongated opening at the extremity containing the projecting wall.

4,002,822

STRAIN RELIEF GROMMET

Mutsuo Kurosaki, Moriguchi, Japan, assignor to Nifco Inc., Tokyo, Japan

Filed July 22, 1976, Ser. No. 707,808
Claims priority, application Japan, July 24, 1975, 50-101711
Int. Cl.² H01B 17/26; H01R 13/58; F16L 5/00
U.S. Cl. 174—153 G **1 Claim**



1. A grommet, which comprises a pair of members, one of said pair of members being possessed of a U groove and provided at the bottom of said groove with a pair of inclined protrusions of which the directions of the inclined edges, when observed in front elevation, cross each other substantially

perpendicularly and the other member being adapted to be coupled into fitting engagement with said U groove and provided with a pair of inclined protrusions of which the directions of the inclined edges, when observed in front elevation, cross each other substantially perpendicularly in such a way that, when the latter member is inserted into the fitting engagement with said U groove, said inclined protrusions confront the pair of inclined protrusions formed on the bottom of the former member, whereby a cord interposed between said two members is gripped fast in a twisted state because of the crossed relationship of the inclined edges of the pairs of inclined protrusions when the two members are pressed against each other into fitting engagement.

4,002,823

METHOD AND APPARATUS FOR VIDEO INSPECTION OF ARTICLES OF MANUFACTURE

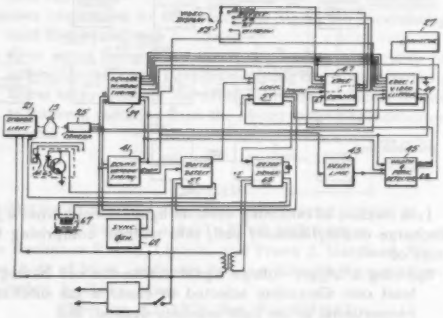
Jack T. Van Oosterhout, Conklin, N.Y., assignor to Ball Corporation, Muncie, Ind.

Filed Nov. 1, 1974, Ser. No. 520,227

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² H04N 7/18

U.S. Cl. 358—106 **18 Claims**



1. An apparatus for video inspection of articles of manufacture comprising:

a light source for providing light rays to illuminate a sample article,

a video camera means for scanning said illuminated sample and for producing for each scan line a video signal corresponding to the difference in refraction characteristics of the portion of the sample scanned, and

means connected to said camera for processing the output signal thereof to produce a defect output signal in response to a scanned defect in said sample, said processing means including

means for suppressing a predetermined portion of the video signal received from said camera means during each of said scan lines, and

means for continuously discriminating between the video signals corresponding to desired changes in the refraction characteristics of said sample as said camera scans across said sample and the refraction characteristic produced by defects in said sample.

4,002,824

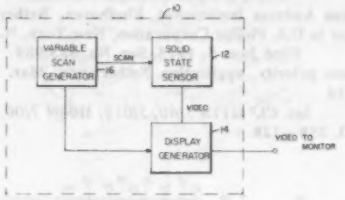
SELECTIVE ZOOM CAMERA AND DISPLAY

Edward A. Petrocelli, Sunrise, Fla., and Anthony C. H. Louie, San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 28, 1976, Ser. No. 652,919

Int. Cl.² H04N 7/00

U.S. Cl. 358—180 **6 Claims**



1. An electronic control system for selectively controlling the scanning rate of a solid state sensor to display a picture with a portion being magnified while the remainder remains constant comprising:

a. solid state sensor means for providing video output signals in response to being electronically scanned,

b. variable scan generator means coupled to said solid state sensor for providing selectively controlled clock signals to drive said solid state sensor,

c. display generator circuit means coupled to said solid state sensor and to said variable scan generator means for providing an output video signal that when displayed will display a picture with a portion being magnified while the remainder remains constant.

4,002,825

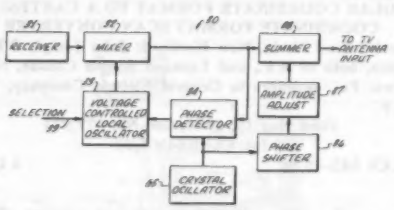
SYSTEM FOR ENCODING AND DECODING AMPLITUDE MODULATED SIGNALS

Donald W. Lewis, Stanton, Calif., assignor to Summit Systems, Inc., Placentia, Calif.

Filed July 25, 1973, Ser. No. 382,574

Int. Cl.² H04N 1/44

U.S. Cl. 325—32 **4 Claims**



3. A system for encoding and decoding an amplitude modulated signal having a carrier component and at least one set of side-bands comprising:

means for shifting the phase of said carrier component relative to the phase of said side bands by an amount sufficient to significantly distort the modulation envelope;

means for transmitting said phase-shifted carrier component and said set of side-bands;

means for receiving said transmitted signal;

means for generating a reference signal having a highly stable frequency;

means for converting the frequency and phase of said received signal to those of said reference signal;

means for shifting the phase and adjusting the amplitude of said reference signal to produce a corrective signal having a frequency, amplitude, and phase which restores the

original, un-phase-shifted amplitude and phase of said carrier component so as to render intelligible said modulation envelope; and

means for summing said frequency and phase converted received signal with said corrective signal.

4,002,826

PLAYBACK APPARATUS, IN PARTICULAR, VIDEO PLAYER, FOR PLAYING ROUND RECORDS PROVIDED WITH INFORMATION TRACKS

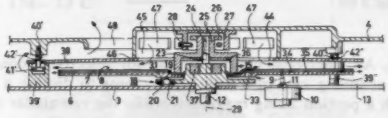
Johannes Andreas Iemenschot, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed June 5, 1975, Ser. No. 583,989

Claims priority, application Netherlands, Mar. 12, 1975, 7502914

Int. Cl.² G11B *3/60, 5/016;* **H04N** *7/00*

U.S. Cl. 358—128 **6 Claims**



1. A playing apparatus in particular a video player, for playing round records which are provided with information tracks and comprising:

a housing with a substantially flat covering plate,

a motor driven spindle which extends from the housing for rotating a record parallel to the covering plate,

a cover hinged to the housing and in the closed condition covering the covering plate and drive spindle, and

a stabilizing plate resiliently connected to the cover and extends substantially perpendicularly to the axis of the drive spindle when the cover is closed, for stabilizing a record during playing in its plane of rotation, while the cover is closed, a number of supports on the covering plate abutting said stabilizing plate when the cover is closed and being spaced therefrom when the cover is open, whereby the position of the stabilizing plate relative to the covering plate is determined by said supports.

4,002,827

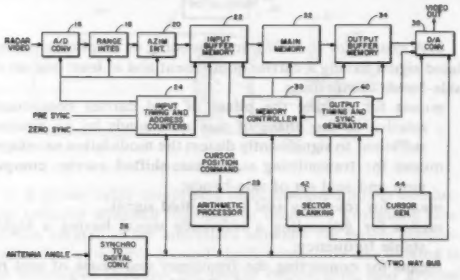
POLAR COORDINATE FORMAT TO A CARTESIAN COORDINATE FORMAT SCAN CONVERTER

Robert Leland Nevin, New Hartford; John Joseph O'Leary, Utica, both of N.Y., and Leonard Joseph Cikotte, Norristown, Pa., assignors to General Electric Company, Utica, N.Y.

Filed May 15, 1975, Ser. No. 577,971

Int. Cl.² H04N *5/02*

U.S. Cl. 343—5 SC **4 Claims**



1. In a radar system including an angularly scanned antenna and an associated receiver system,

a scan converter for converting pulse-generated radar data received via said antenna — receiver system in polar coordinate scan format to an *x-y* cartesian coordinate format comprising, in combination:

means for generating a cosine signal representative of the cosine of the antenna angle, said angle being defined by the angle between the polar coordinate radius along with said radar data is generated and a predetermined reference radius;

means operating in response to said cosine signal for generating a train of clock pulses for each radar pulse, the repetition rate of said pulses being a function of the cosine of said angle;

sampling means for generating a data signal representative of said radar in response to each of said clock pulses;

memory means having storage locations addressible in accordance with said x-y cartesian coordinate format;

means for loading said data signals into said memory means including a Y-address counter and means for incrementing said counter synchronism with said clock pulses, and

means for reading said data signals out of said memory in a sequence compatible with said cartesian coordinate format.

4,002,828

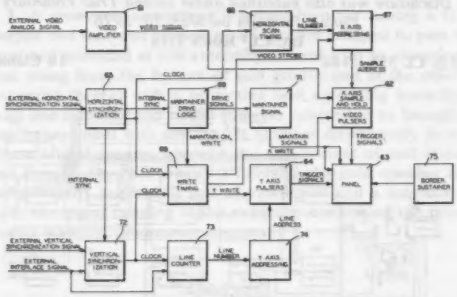
METHOD AND CIRCUIT FOR GENERATING GRAY SCALE IN GASEOUS DISCHARGE PANELS

James F. Nolan, Sylvania, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Nov. 28, 1975, Ser. No. 635,801

Int. Cl.² H04N *5/66, 3/10*

U.S. Cl. 358—240 **36 Claims**



1. A method of obtaining variable light intensity from a gas discharge display/memory cell, said method comprising the steps of:

applying a trigger voltage signal across the cell having at least one dimension selected to cause a gas discharge proportional to the light intensity desired; and

applying an alternating current maintain voltage signal to the cell of a magnitude insufficient to initiate a gas discharge or to maintain a sequence of gas discharges of relatively constant intensity for an indefinite length of time, the maintain voltage magnitude being sufficient to maintain a sequence of gas discharges for a number of cycles of the maintain voltage signal proportional to the selected dimension of the trigger voltage signal.

4,002,829

AUTOSYNCHRONOUS OPTICAL SCANNING AND RECORDING LASER SYSTEM WITH FIBER OPTIC LIGHT DETECTION

John Grear Hutchison, Baltimore, Md., assignor to W. R. Grace & Co., New York, N.Y.

Filed Aug. 29, 1974, Ser. No. 501,638

Int. Cl.² H04N *1/02*

U.S. Cl. 358—286 **39 Claims**

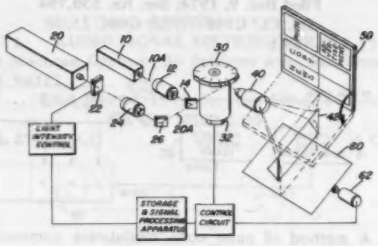
1. In a scanning and recording device for making an image of an object including;

means for simultaneously linearly advancing the object and a photosensitive recording surface disposed in parallel spaced apart facing arrangement on opposite sides of a rectilinear scan deflector means;

means for providing a first modulatable beam of coherent laser radiation;

means for providing a second beam of focusable radiation;

optical scanning means for receiving said first and second beams and for causing said beams to be directed along narrowly divergent paths toward said rectilinear deflector means and then directing said first beam toward said photosensitive surface while simultaneously directing said second beam toward said object in cooperation with said advancing means to form a simultaneous rectilinear scanning raster pattern of said beams across said surface and said object respectively;



said optical scanning means further comprising flat field lens means to simultaneously focus both beams;

photodetector means for receiving radiation from the object and for generating an electrical signal representative of said radiation;

means responsive to said electrical signal for modulating said first beam; and

a fiber optic line-to-spot converter having a plurality of internally-reflecting light-transmitting fibers arranged in a linear array adjacent the rectilinear scan deflector means to transmit radiation from the object to the photodetector means.

4,002,830

APPARATUS FOR COMPENSATING FOR OPTICAL ERROR IN A ROTATIVE MIRROR

John Buchanan Brown, Lincoln, and Frank J. Gardiner, Weston, both of Mass., assignors to Laser Graphic Systems Corporation, Sudbury, Mass.

Filed Jan. 22, 1975, Ser. No. 543,082
Int. Cl.² G02D *17/00*; H04M *5/84*
U.S. Cl. 358—293 **9 Claims**

1. An optical scanning apparatus comprising:

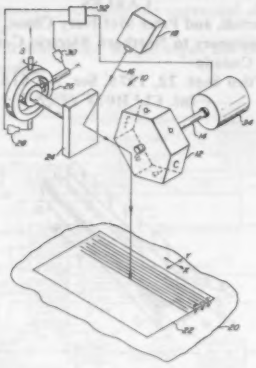
a polygonal radiation deflecting device for scanning radiation across a surface and means mounting said device for rotation about an axis substantially parallel to a plurality of radiation deflecting facets on said device, said plurality of facets being substantially congruent and the angles between each pair of adjacent facets being substantially equal;

means for compensating for optical errors in the angular relationship of said facets;

said compensating means comprising radiation deflecting means positioned intermediate a source of radiation and said surface for deflecting the radiation to be deflected by said facets, at least part of said deflecting means being movable in a first direction such that movement in said first direction would cause said radiation to move along said surface in a direction parallel to the direction of scan;

wherein at least part of said deflecting means is movable in a second direction such that movement in said second direction would cause said radiation to move along said surface in a direction perpendicular to the direction of scan and wherein each of at least some of said signals in said set is proportional to the error in the angle between a facet and said axis of said device;

electro-mechanical transducer means operatively associated with said deflecting means for moving said deflecting means in response to electrical signals applied to said transducer means; and



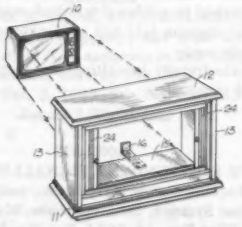
means for generating a set of signals synchronized to the rotation of said polygonal deflecting device, each of at least some of said signals said set being proportional to the error in the angle between a pair of facets.

4,002,831

CONSOLE CABINET FOR PORTABLE TELEVISION RECEIVER

Eugene Aeschliman, Jackson, Miss., assignor to DeSoto, Inc., Des Plaines, Ill.

Filed Mar. 29, 1976, Ser. No. 671,291
Int. Cl.² H04M *5/64*
U.S. Cl. 358—254 **10 Claims**



1. A console cabinet for a portable television receiver, said cabinet comprising, in combination:

a. a base, a top, open front and rear sides, and a pair of sidewalls attached to said base and terminating at said top;

b. supporting means disposed in a lower portion of said cabinet positioned for holding in a generally horizontal position vertical adjustment receiver support means disposed above said base wherein the entirety of said adjustment means overlies said base, and the upper side of said adjustment means receives said receiver; and,

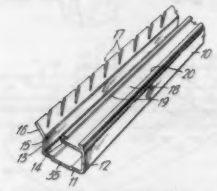
c. open front closure means disposed over said base and between said sidewalls and top adjustment strip means permitting partial closure of said open front whereby

when the receiver is inserted in said cabinet on said adjustment means, and adjusted upwards or downwards in said cabinet, and said closure means frames said receiver, a floor console model is obtained.

4,002,832
LOADING COIL ASSEMBLIES FOR COMMUNICATIONS CABLES

George Debortoli, and Peter McGivery Chase, both of Ottawa, Canada, assignors to Northern Electric Company Limited, Montreal, Canada

Filed Sept. 22, 1975, Ser. No. 615,547
Int. Cl.² H01F 17/08
U.S. Cl. 178—46 12 Claims



1. A loading coil assembly comprising:

a body member of a length of preformed electrically insulated material open at each end and having a channel shaped cross-section including a substantially flat base web and two spaced apart side webs extending substantially normal to said base web, and a top web on an upper part of one of said side webs, said top web extending inwardly over and spaced from said base web, said side webs spaced a distance equal to the diameter of a coil and said top web spaced from said base web at least the thickness of a coil, said base web, said side webs and said top web defining a substantially rectangular cross-section corresponding to the cross-section of a coil viewed in a direction normal to the axis of a coil;

a terminal strip on said top web and including terminals thereon;

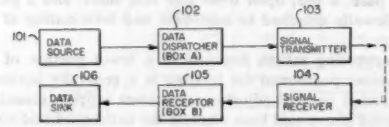
a plurality of loading coils positioned side by side in said body member, the axes of said coils spaced apart along said body member parallel to each other and normal to the plane of said base web, each end of the winding of a coil attached to a related terminal, said top web, and said terminal strip on said top web, extending part-way over said coils; and

separate electrically insualting means positioned between each of said coils.

4,002,833
RATE INDEPENDENT SIGNALLING MEANS

Joseph J. Eachus, Cambridge, Mass., assignor to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Dec. 20, 1974, Ser. No. 534,972
Int. Cl.² H04L 27/00
U.S. Cl. 178—66 R 11 Claims



1. An apparatus for serially conveying in a rate-independent fashion at least three different discrete units of information by changing the signal states of two bi-level signals, said apparatus comprising:

means for changing the signal state of the first bi-level signal to represent a first discrete unit of information;

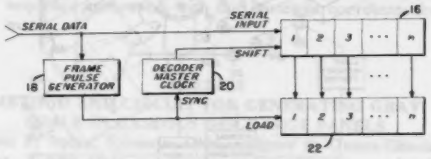
means for changing the signal state of the second bi-level signal to represent a second discrete unit of information; and

means for changing the signal states of both the first bi-level signal and the second bi-level signal to represent a third discrete unit of information.

4,002,834
PCM SYNCHRONIZATION AND MULTIPLEXING SYSTEM

James Alfred Cocci, Leominster, Mass., and Maurice L. Schiff, Fort Wayne, Ind., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 9, 1974, Ser. No. 530,794
Int. Cl.² G06F 11/12; G08C 25/00
U.S. Cl. 178—69.1 17 Claims



1. A method of pulse code modulation communication comprising the steps of

a. transmitting a plurality of discrete binary 1's;

b. serially transmitting a group of n data bits representative of a quantized, pulse code modulated signal after each discrete 1 of said plurality of binary 1's;

c. serially transmitting $n + 1$ binary 0's after each said group of n data bits;

d. generating a decoder frame pulse in response to receipt of a binary 1;

e. generating a decoder clock in response to the leading edge of said frame pulse;

f. pulsing a decoder shift register with said decoder clock to enter each of said groups of n data bits in said decoder shift register;

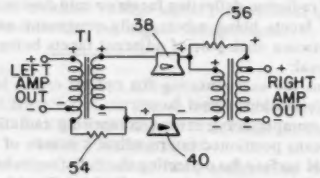
g. triggering a buffer register in response to the trailing edge of said frame pulse to load said buffer register with said n data bits from said decoder shift register;

whereby the maximum time where loss of synchronization between transmission and reception occurs is $2(n + 1)T$, where T is the time between data bits.

4,002,835
MULTI-CHANNEL DECODING CIRCUIT FOR TWO-CHANNEL AUDIO SYSTEMS

Roger L. Bumber, 740 S. Ridgeland Ave., Oak Park, Ill. 60304

Filed June 6, 1975, Ser. No. 584,589
Int. Cl.² H04R 5/00
U.S. Cl. 179—1 GQ 7 Claims



1. A passive bridging circuit for producing additional powered channels of audio information from the speaker outputs of the left and right channels of a stereo amplifier comprising:

a. a pair of loudspeakers each having a positive and negative terminal for connecting to an audio source;

b. left and right channel transformers having primaries and secondaries, the primaries being connected to the said stereo amplifiers's left and right speaker position and negative outputs respectively, the loudspeakers coupling the secondaries of the two transformers, one loudspeaker between the two plus terminals of the secondaries and the other loudspeaker between the two minus terminals, and

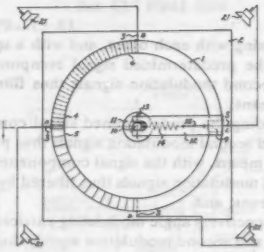
c. resistive means connecting the primaries of said transformers to one of said speaker terminals for coupling in-phase information to said speakers to obtain back separation,

whereby said loudspeakers are coupled across the left and right channels of said amplifier to reproduce sound corresponding to the difference between the left and right signals from the amplifier.

4,002,836
AUDIO SIGNAL DISTRIBUTOR

Gilbert MacLean Gardner, 58 Brighton Ave., San Francisco, Calif. 94112

Filed July 24, 1975, Ser. No. 598,836
Int. Cl.² H04R *5/00*
U.S. Cl. 179—1 GQ **6 Claims**



1. An audio sound producing system comprising:

a. a plurality of speakers arranged in a preselected pattern about a listening area;

b. a source of audio signals capable of actuating said speakers;

c. an audio signal distributing device for distributing said source of audio signals through said speakers, said audio signal distributing device including an annular dielectric form;

d. a plurality of tie-points, mounted an equal distance apart, on said form, the number of said tie-points corresponding to the number of said speakers;

e. a shaft adapted to be rotated at the center of said dielectric form, said shaft having a wiper arm thereon, said wiper arm passing over said form;

f. a pair of conductive windings for each tiepoint, each winding of the pair being wound in opposite directions around the form up to the next adjacent tie-point, but being insulated from the adjacent tie-point.

4,002,837
TRANSCEIVER

Theran L. Ebner, and Donald W. Hawkins, both of Houston, Tex., assignors to Houston Natural Gas Corporation, Houston, Tex.

Filed Sept. 17, 1975, Ser. No. 614,035
Int. Cl.² H04Q *9/00*
U.S. Cl. 179—2 AM **15 Claims**

1. A data transceiver for transmitting interrogating signals to sequentially activate and poll a plurality of data transponders connected to a common telephone communication path and receiving and processing data from an activated transponder transmitting data, comprising,

an input having means to transmit interrogating signals and operating power for the transponders through the communication path,

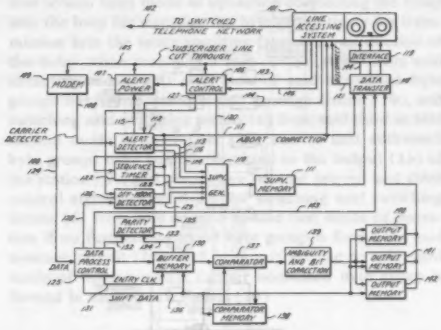
temporary storage means connected to the input means to store the received data from the transponders,

parity means connected to the temporary storage means to check parity of the received data,

a comparator and a comparator memory connected to the temporary storage means for correcting ambiguities in the position of the errors in the received data,

an output memory receiving the corrected data from the comparator,

a data control connected to the input for controlling the data processing,



means connected to the input to detect when a telephone connected to the path is activated by lifting its receiver "off hook" while signals and data are being transmitted,

a supervisory information character generator connected to the input for providing identifying data corresponding to various operating conditions occurring in the operating sequence of said transceiver,

a supervisory output memory connected to the supervisory character generator to store the identifying data,

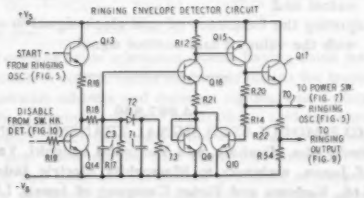
a common data output for receiving data from said output memories, and

a data transfer circuit to multiplex the outputs of the output memories to the common data output.

4,002,838
TELEPHONE RINGING CONTROL CIRCUITS

Barry Sheldon Bosik, Parsippany, and Dale Eugene Stone, Cedar Knolls, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 5, 1975, Ser. No. 638,163
Int. Cl.² H04H *1/08*
U.S. Cl. 179—2.5 R **8 Claims**


RINGING ENVELOPE DETECTOR CIRCUIT
START — FROM RINGING OSC. (FIG. 5)
DISABLE FROM SW. HK. DET. (FIG. 10)
TO POWER SW. (FIG. 7)
RINGING OSC (FIG. 5)
TO RINGING OUTPUT (FIG. 9)

1. A delay circuit having a hysteresis delay characteristic comprising

an integrating detector,

a threshold responsive means connected to said detector and including threshold establishing means, and

feedback means from said threshold responsive means for altering said threshold establishing means.

4,002,839

METHOD AND APPARATUS FOR THE MUTUAL SYNCHRONIZATION OF THE EXCHANGE CLOCK PULSE OSCILLATORS IN SWITCHING SYSTEMS OF A PCM TIME DIVISION MULTIPLEX TELECOMMUNICATION NETWORK

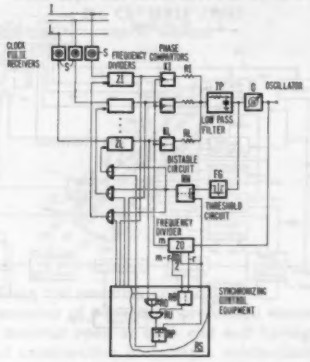
Otto Karl, Forstenrieder Allee 78/III, and Reiner Binz, Rohrauerstrasse 58, both of, 8000 Munich 71, Germany

Filed May 27, 1975, Ser. No. 581,376

Claims priority, application Germany, May 27, 1974, 2425604

Int. Cl.[2] H04J 3/06

U.S. Cl. 179—15 BS 10 Claims



1. In a time division multiplex (TDM) telecommunication network wherein each exchange installation therein includes a clock oscillator, a method for synchronizing that clock oscillator with clock oscillator signals received on incoming trunks from other exchanges in the network, comprising the steps of:

dividing the output frequency of said clock oscillator,

dividing the frequencies received on said incoming trunks producing an output phase displaced from said divided clock oscillator output by 180° using reference phase regeneration,

initiating said reference phase regeneration when said clock oscillator frequency drifts from the no-load frequency by an amount exceeding a predetermined limit value which is attainable with the minimum number of phase comparators used in any said exchange installation, which limit value is independent of the total number of phase comparators used in any said exchange installation,

comparing the phase of said clock oscillator signal individually with the phase of each said clock oscillator signal on said incoming trunks by means of phase discriminators, one of which is assigned to each incoming trunk,

producing a control signal which corresponds to one of the sum or mean value of the outputs of said phase discriminators and

adjusting the frequency of said clock signal in accordance with the value of said control signal.

4,002,840

ANGLE-MODULATED SIGNAL TRANSMISSION SYSTEM

Tadashi Abe, Hirakata, and Yukinobu Ishigaki, Yamato, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma and Victor Company of Japan, Limited, Yokohama, both of, Japan

Filed June 24, 1975, Ser. No. 589,750

Claims priority, application Japan, June 25, 1974, 49-71879; Jan. 30, 1975, 50-13061

Int. Cl.[2] H04R 5/00

U.S. Cl. 179—15 BT 9 Claims

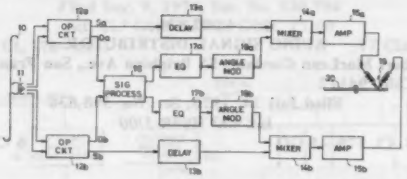
1. An angle-modulated signal transmission system comprising:

a plurality of transmission path means for respectively transmitting angle-modulated signals;

means for supplying to said transmission path means at least first and second modulation signals;

first filtering means for filtering, from the first and second modulation signals, predetermined signal components in a band of predetermined frequencies which are conducive to a generation of interference distortion during transmission and thereafter during demodulation, the interference being caused by crosstalk between the angle-modulated signals;

second filtering means for filtering, from the first and second modulation signals, signal components in a band of frequencies which are other than said predetermined frequencies;



means for mixing with each other, and with a specific mixing ratio, the predetermined signal components of the first and second modulation signals thus filtered by the filtering means;

means for adding the predetermined signal components of the first and second modulation signals thus processed by the mixing means, with the signal components of the first and second modulation signals thus filtered by the second filtering means; and

means for respectively angle modulating carriers responsive to the first and second modulation signals thus processed by the mixing means and adding means, and for supplying the resulting angle-modulated output signals to the respective transmission path means.

4,002,841

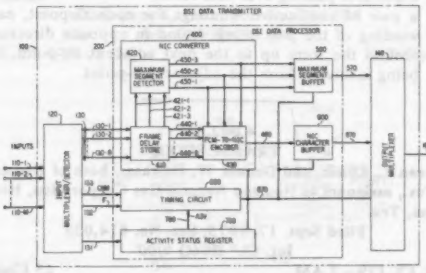
DATA COMPRESSION USING NEARLY INSTANTANEOUS COMPANDING IN A DIGITAL SPEECH INTERPOLATION SYSTEM

Yau-Chau Ching, Morganville; Allan Michael Hofmann, Jackson, and David Gavin Messerschmitt, Middletown, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 21, 1976, Ser. No. 650,936

Int. Cl.[2] H04J 6/02

U.S. Cl. 179—15 AS 12 Claims



1. In a digital communication system for communicating digitized message samples between a transmitting station and a receiving station over a first plurality of trunks through a second plurality of channels; said system including activity status means for determining whether each trunk is active or inactive; buffer means for forming multibit output frames,

each frame including an activity status field and a data field; and overload mitigating means operative upon said digitized message samples; and CHARACTERIZED IN THAT said system further comprises:

means for applying nearly instantaneous companding to said digitized message samples to form second digitized message samples; and

means responsive to said buffer means and to said applying means for forming a multiframe, said multiframe including a plurality of frames, each frame including predetermined ones of said second digitized message samples in said data field thereof.

4,002,842
TIME MULTIPLEX LOOP TELECOMMUNICATION SYSTEM

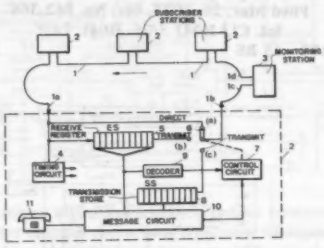
Heini Meyr, Hinterkappelen; Hansjurg Mey, Kehrsatz; Zdenek Nenadal, Bern; Markus Tschanz, Koniz; Eberhard W. Vogel, Bern, and Emanuel Hafner, Wohlen, all of Switzerland, assignors to Hasler AG, Bern, Switzerland

Continuation-in-part of Ser. No. 376,233, July 3, 1973, abandoned. This application Feb. 10, 1975, Ser. No. 548,604

Claims priority, application Switzerland, July 4, 1972, 9903/72; June 8, 1973, 8425/73

Int. Cl.² H04J *3/08*

U.S. Cl. 179—15 AL **3 Claims**



1. In combination

a closed unidirectional transmission loop (1)

plural stations (2) for transmitting information signals and signalling codes in form of addressed telegrams or byte groups each provided with an address and having the same number bytes, among such stations and having each an input (1*a*) and an output (1*b*), the input of each station being connected to the output of another of said stations by a section of said loop;

each said station (2) being operable in a first, a second and a third mode of operation respectively, said first mode of operation corresponding to the idle state of the station;

means (3) generating a continuous byte stream circulating in said transmission loop (1);

each said station (2) comprising

a subscriber set (11);

a message circuit (10) connected to said subscriber set (11) and including first storing means for storing at least one address and means for forming addressed byte groups by adding one of the stored addresses to every information which is ready for transmission in the station;

second storing means (5) having a serial input connected to the input (1*a*) of the station (2), a parallel output connected to said message circuit (10) and a serial output, and storing for a byte group period the bytes appearing at its input providing a delay equal to the time required for transmission of one byte group to the loop;

switching means (6) connecting in said first mode of operation the input (1*a*) of the station (2) to the output (1*b*) thereof, connecting in said second mode of operation the serial output of said second storing means (5) to the output (1*b*) of the station (2) thus connecting the delay in circuit with the loop, and transmitting in said third mode of operation one of said addressed byte groups to the output (1*b*) of the station (2);

detecting means (9) delivering first control signals at the end of every byte group appearing at the input of the station and delivering a second control signal when detecting at the input of the station a byte group addressed to the station, and a third control signal when detecting at the input of the station one of said addressed byte groups formed and transmitted by the station itself;

control means (7) connected to be actuated by said message circuit (10) and said detecting means (9) and connected for switching said switching means (6) from said first to said third mode of operation connecting the delay into the loop for inserting the byte group ready for transmission into the space resulting from the introduction of the delay when receiving a first control signal from said detecting means (9) after one of said addressed byte groups has been formed in said message circuit (10), and switching said switching means (6) from said third to said second mode of operation after one of said addressed byte groups have been transmitted to the output (1*b*) of the station (2), and responsive on said second and third control signals respectively for switching said switching means (6) from said second to said first mode of operation if no further addressed byte group is formed in said message circuit (10), and from said second to said third mode of operation if a further addressed byte group is formed in said circuit means (10).

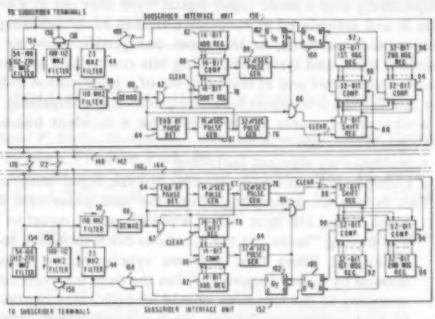
4,002,843
TAMPER-PROOF TWO-WAY CABLE SYSTEM

Michael I. Rackman, 1710 Glenwood Road, Brooklyn, N.Y. 11230

Continuation of Ser. No. 424,925, Dec. 17, 1973, abandoned, which is a continuation of Ser. No. 290,857, Sept. 21, 1972, abandoned. This application Aug. 4, 1975, Ser. No. 601,544

Int. Cl.² H04J *3/08*

U.S. Cl. 179—15 AL **2 Claims**



2. In a two-way cable television system having cable means, a central control connected to said cable means for transmitting downstream address and message signals, and a plurality of subscriber terminals coupled in parallel to said cable means each of which receives signals from and transmits message signals to said cable means, said subscriber terminals being situated on the different residential premises of respective subscribers, the improvement comprising a plurality of interface units situated off the premises of said subscribers and out of their reach and control, each for coupling at least one subscriber terminal to said cable means, each of said interface units including means for recognizing the downstream transmission of the address of the respective at least one subscriber terminal, means for recognizing the downstream transmission of predetermined messages following the recognition of the downstream transmission of the address of the respective at

least one subscriber terminal, and means responsive to the recognition of said predetermined messages for controlling thereafter respective modes of transmission of signals between said cable means and said at least one subscriber terminal, and wherein each of said interface units couples a respective plurality of subscriber terminals to said cable means, all of the subscriber terminals coupled to said cable means by the same interface unit having respective addresses with a portion thereof in common, and said address recognizing means is operative to recognize the downstream transmission of said common address portion for operating said controlling means.

4,002,844

DEVICE FOR MULTIPLEXING N ASYNCHRONOUS DIGITAL TRAINS

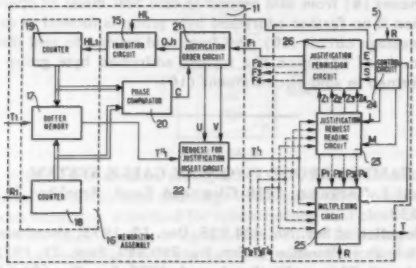
Pierre Doussoux, Paris, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Mar. 19, 1975, Ser. No. 560,010

Claims priority, application France, Apr. 25, 1974, 74.14460

Int. Cl.² H04J 3/06

U.S. Cl. 179—15 AF **2 Claims**



1. Device for multiplexing n incident quasisynchronous digital trains T*l* to T*n* having individual pulse rates R*l* to R*n* respectively into a more rapid digital train sent out at a pulse rate R and articulated in successive frames each including, at determined locations, at the most one justification bit per incident train, and systematic filling bits comprising an identification character and at least one set of *n* justification indicator bits for the n incident trains respectively, comprising:

n channel elements for receiving the *n* incident trains respectively, and

a multiplexing element including

a multiplexing circuit for sending out the rapid train, and

first means for generating, from the said pulse rate R, a clock signal HL sent out at a pulse rate R′ equal to R/*n* and having "holes" at the locations corresponding to the systematic filling bits, a frame synchronizing signal S formed by pulses occuring within the time intervals corresponding to the locations of said identification characters in said successive frames, and a justification location signal defining the locations allocated in said successive frames for the justification bits,

each of said channel elements, which receives an incident train T*i* (*i* = 1, . . . , *n*), including

second means connected to receive the clock signal HL and generating, under the control of a control signal applied thereto, additional "holes" in said clock signal HL, in the locations corresponding to the justifications bits, said circuit sending out a clock signal HLi,

buffer means receiving said train T*i*, controlled for load by a clock signal having the pulse rate R*i* and for unload by said clock signal HL*i*, and sending out a digital train T″*i*,

a phase comparator for comparing the phase of said clock signal HL*i* and the phase of said clock signal at the pulse rate R*i*,

third means connected to the output of said phase comparator and connected to receive said signal S, for generating a signal representing the result of the phase comparison at each pulse of said signal S,

fourth means controlled by said third means for inserting in the outgoing train T″*i* of said buffer means, within the duration of each pulse of said signal S, a justification request signal which is a function of said signal representing the result of the phase comparison, the digital train emerging from the said fourth means being sent to the multiplexing circuit,

said multiplexing element further including

fifth means for reading each of the *n* justification request signals, the fifth means controlling the said multiplexing circuit for the inserting of the justification indicator bits in the rapid train, and

sixth means for generating from the said justification location signal and as a function of the result of the said reading, *n* justification permission signals for the said *n* incident trains respectively, each of said *n* justification permission signals being sent to the corresponding channel element wherein this justification permission signal is applied for controlling said second means.

4,002,845

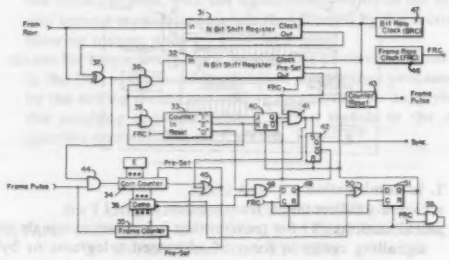
FRAME SYNCHRONIZER

Pradman P. Kaul, Gaithersburg, and Pradeep Kaul, Rockville, both of Md., assignors to Digital Communications Corporation, Gaithersburg, Md.

Filed Mar. 26, 1975, Ser. No. 562,366

Int. Cl.² H04J 3/06; H04L 7/08

U.S. Cl. 179—15 BS **17 Claims**



1. A frame synchronizer for searching for framing bits of an N bit frame in a stream of binary signals occurring at a bit rate and wherein said frames repeat at a rate equal to said bit rate divided by N, comprising;

first means for comparing each bit of said stream with the corresponding bit in a previous frame and for producing a distinctive signal if said bits are different,

an N bit shift register clocked at said bit rate and providing an output,

second means providing a distinctive input to said register if and only if, said first means produces said distinctive signal contemporaneous with a distinctive output of said shift register,

counting means connected to the output of said shift register for counting distinctive outputs of said shift register,

memory means operated by said counting means to a predetermined condition if, and only if, said counting means counts a single distinctive output in a period corresponding to a single frame,

third means for identifying said framing bit and producing an output if, and only if, said shift register produces a distinctive output when said memory means is in said pre-determined condition,

timing means for producing frame pulses at said framing rate, said timing means being connected to and reset by said third means output, and,

an out-of-sync detector including a second and third count-

ing means, said second counting means connected to and counting the output of said timing means,

said third counting means counting contemporaneous outputs of said timing means and said first means, and

comparator means connected to outputs of said second and third counting means for producing an out-of-sync signal when the output of said second counting means exceeds the output of said third counting means.

4,002,846

MULTIPLEXED DIGITAL TRANSMISSION SYSTEM WITH MEANS FOR CHANNEL INSERTION AND EXTRACTION

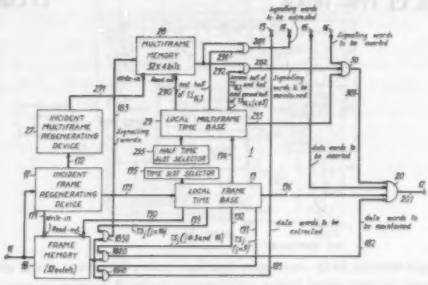
Xavier N. Barbier, Plessis Trevise, France, assignor to Societe Anonyme de Telecommunications, Paris Cedex, France

Filed Dec. 22, 1975, Ser. No. 643,001

Claims priority, application France, Dec. 31, 1974, 74.43511

Int. Cl.² H04J 3/08

U.S. Cl. 179—15 BD **3 Claims**



1. A multiplex digital transmission system comprising:

a multiplex channel comprising a plurality of digital component channels;

each of said component channels conveying data information and signalling information;

the data information of said digital component channels being time multiplexed in time slots containing data words and forming a frame;

the signalling information of said component channels being time multiplexed in time slot parts containing signalling words and forming a multiframe;

a plurality of component channel extraction and insertion stations located along the transmission path of the system channels;

each of said extraction and insertion stations having an input, an output, a particular insertion input and a particular extraction output;

means in each of said stations for reconstituting the frame of the incoming multiplex digital channel connected to said input of said extraction and insertion station;

means driven by said frame reconstituting means for reconstituting the multiframe of the incoming multiplex channel;

a data and signalling word store, a write addressing means for the data word and a signalling word store all controlled by said frame reconstituting means;

a signalling word store and a write addressing means controlled by said multiframe reconstituting means;

a self driven local frame time base synchronized by said frame reconstituting means;

means controlled by said local frame time base to selectively direct the words stored in said data word and signalling word store to said signalling word store;

a multiframe time base driven by said self driven local frame time base;

means for selectively directing parts of the signalling words stored in said signalling word store to the output of said multiplex channel and to the particular extraction output of the corresponding component channel; and,

means for inserting in the output of the multiplex channel data words and signalling words applied to the input of the particular insertion means of the digital component channels.

4,002,847

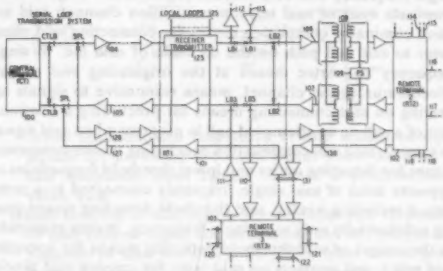
FAULT ISOLATION IN A SERIAL-LOOPED TRANSMISSION SYSTEM

James Edward Dail, Budd Lake, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 29, 1975, Ser. No. 645,022

Int. Cl.² H04J 3/14

U.S. Cl. 179—15 AL **10 Claims**



9. In a serial data loop transmission system including a central station and a plurality of remote stations, a loop sectionalizing system comprising:

a sectionalizing switch at each of said remote stations,

signaling means at each central station for selectively controlling said sectionalizing switches, and

delay means at each of said remote stations for selectively delaying the operation of said sectionalizing switches at each of said remote stations not currently selectively controlled by said signaling.

4,002,848

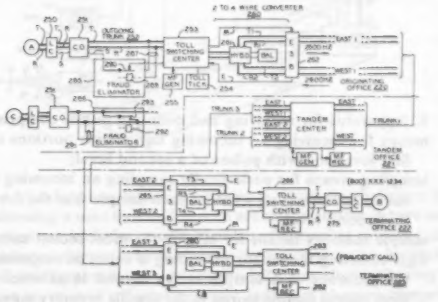
TOLL FRAUD ELIMINATOR FOR TELEPHONE SYSTEMS

Richard P. Stein, Monrovia, Calif., assignor to Reliable Electric Company, Franklin Park, Ill.

Continuation-in-part of Ser. No. 523,566, Nov. 14, 1974, abandoned. This application Sept. 26, 1975, Ser. No. 617,188

Int. Cl.² H04M 1/66

U.S. Cl. 179—18 DA **13 Claims**



1. A system including a single frequency toll fraud eliminator, said system comprising a telephone exchange having a

plurality of lines connected to one side and trunks connected to the other side, at least one of said trunks comprising a d.c. to single frequency converter means connected to originate and terminate ends of said one trunk; said toll fraud eliminator comprising single frequency tone detecting means connected to said one trunk on the d.c. side of said d.c. to single frequency converter means at the end of said one trunk where said call originated, whereby said tone detector is connected into said trunk at a point where an apparently valid control tone signal of said single frequency cannot legitimately appear, said single frequency tone detecting means operating responsive to signals having said single frequency and call barring means operated responsive to said single frequency tone detecting means for interrupting any call connection from said exchange which is then using said telecommunication channel.

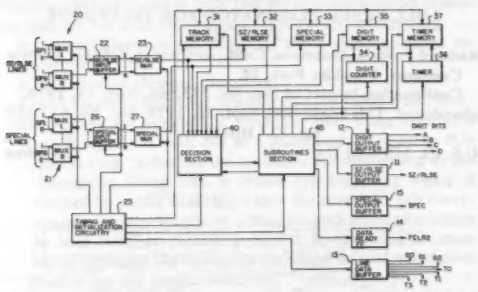
11. A toll fraud eliminator for use on a toll path including at least one telecommunication channel, comprising a d.c. to single frequency converter means connected to originate and terminate ends of said telecommunication channel; said toll fraud eliminator comprising means for connecting said eliminator to said toll path on the d.c. side of said d.c. to single frequency converter means at the originating end of said telecommunication channel, means responsive to signals appearing on said connecting means for precluding a continuation of a call or an attempted call in progress when said signals so appear, said call continuation precluding means comprising means for detecting upper and lower threshold frequencies on opposite sides of said single frequency connected in a series circuit including a relay, said threshold detecting means passing substantially only said single frequency, means responsive to the output of said threshold detecting means for operating said relay, and contacts on said relay for causing said preclusion of the continuation of said telephone call.

4,002,849

SCANNING APPARATUS FOR DETECTING AND ANALYZING SUPERVISORY AND SIGNALING INFORMATION

Frederick Kotler, Needham, Mass., and David A. Zlotek, Nashua, N.H., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Oct. 14, 1975, Ser. No. 621,771
Int. Cl.² H04M *3/22*
U.S. Cl. 179—18 EB **14 Claims**



1. Apparatus for receiving and counting pulses comprising

means for receiving an incoming signal with portions of a first level and with pulses of a second level;

sampling means for periodically sampling an incoming signal and determining whether each sample is at the first or the second level;

sample memory means for storing the most recent sample;

digit counting means for recording a count in response to the presence of a sample at the second level when the most recent sample stored in the sample memory means is at the first level;

timing means for accumulating a count of samples at the first level;

means for clearing the timing means of the accumulated count therein in response to the presence of a sample at the first level when the most recent sample stored in the sample memory means is at the second level;

readout means for reading out the accumulated count in the digit counting means when a predetermined accumulated count is present in the timing means; and

means for clearing the digit counting means of the accumulated count therein subsequent to reading out of the accumulated count by the readout means;

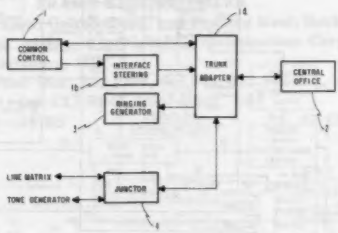
whereby the readout means produces a count of the number of pulses at the second level occurring prior to a period at the first level sufficiently long for the timing means to accumulate a count equal to said predetermined count.

4,002,850

TRUNK ADAPTER

Glenn L. Richards, Caledonia, and Uwe A. Pommerening, Webster, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Mar. 25, 1975, Ser. No. 561,871
Int. Cl.² H04Q *3/58*
U.S. Cl. 179—18 AH **13 Claims**



1. In a common control private automatic branch exchange telephone system having trunks and associated junctor circuits for connecting said system with a central office and being associated with said system on a time-shared basis,

the improvement comprising a trunk adapter, interconnected with the junctor circuits of said system and with said central office, for carrying out a purality of different trunk functions which are continuosly monitored by said common control, to thereby effect the coupling of said system to said central office.

4,002,851

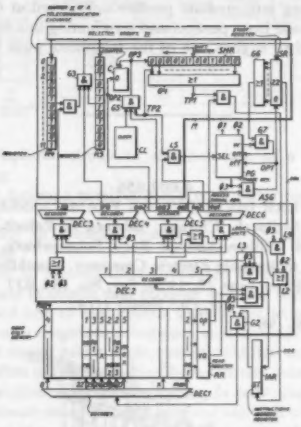
TELECOMMUNICATION SYSTEM CONTROLLED BY STORED PROGRAM INSTRUCTIONS

Lars-Ake Evert Larsson, Huddinge, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed May 19, 1975, Ser. No. 578,734
Claims priority, application Sweden, June 6, 1974, 7407431
Int. Cl.² H04Q *3/54*
U.S. Cl. 179—18 ES **6 Claims**

1. In a stored program controlled telecommunication system operating in processing cycles and having test points accessible for testing their binary state by means of test access signals, operating points accessible for activation by means of operating access signals, and data storage registers accessible for sending and receiving, respectively, data by means of data transfer access signals, control apparatus comprising: a phase signal generator means for generating series of differently phased timing signals for dividing each processing cycle into a set of different phases; an instruction address register for storing instruction addresses, said instruction address register having means for incrementing a stored instruction address in response to an incrementing control signal; instruction register means having a plurality of addressed storage registers each having an instruction address assigned thereto and each

storing a control instruction; data transfer connecting means interconnecting at least some of said registers including said data storage registers; and access signal generating means connected to said phase signal generator means, to said instruction address register, to said addressed storage registers, to said test points, to said operating points and to at least some of said data storage registers and including means for generating test access signals for transfer to said test points upon receipt of test control instructions from said addressed storage registers, for generating operating access signals for transfer to said operating points upon receipt of operating control instructions from said addressed storage registers and for generating transfer signals upon receipt of transfer control instructions from said addressed storage registers, said access signal generating means further comprising a first logic means operative during at least one of the phases of the processing cycle for controlling the transfer to said means for generating the access signals of the contents of the addressed storage register whose instruction address is stored in said instruction address register, a second logic means for transmitting said incrementing control signal to said incrementing means of said instruction address register during another of the phases of the processing cycle, and third logic means operative in response to one of the control instructions for controlling the transfer of the address of one of the addressed storage registers stored in one of said registers to said instruction address register during a further phase of the processing cycle.



4,002,852
ELECTRONIC TELEPHONE NETWORK

Kenneth Watt Martin, Corinth, Miss., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed July 8, 1975, Ser. No. 594,026
Int. Cl.² H04M *1/00, 1/60*
U.S. Cl. 179—81 B **17 Claims**

1. An electronic telephone network for receiving and transmitting signals over a two-wire telephone line the impedance of which may vary over a given range, said network comprising in combination:

a preamplifier,

means for applying telephone input signals to said preamplifier;

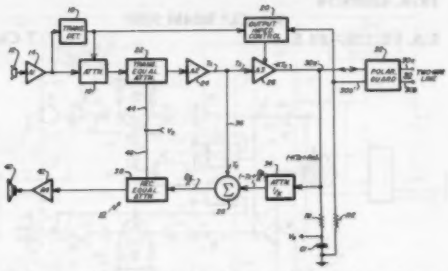
a line-driver amplifier having an input coupled to said preamplifier and an output coupled to said line and being responsive to said preamplifier for amplifying the output signals of said preamplifier and wherein the gain of said line-driver amplifier varies in accordance with its output impedance relative to the impedance of said line;

means coupled across said line-driver amplifier for substantially separating received signals from said telephone line and for providing the separated signals at an output thereof, said separating means including an attenuator wherein an attenuated portion of the signals at said output of said line-driver amplifier is combined with a portion of the signals at its input to provide said separated signals;

a receive amplifier coupled to said output of said separating means for increasing the level of said separated signals;

means for deriving operating potential for said network from said line;

means coupled between said preamplifier and said line-driver amplifier and responsive to said telephone input signals for providing a control signal when the level of said telephone input signals exceeds a predetermined value; and,

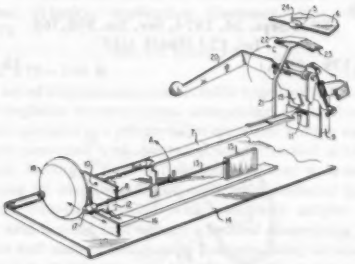


means coupled to said line-driver amplifier and responsive to said control signal for decreasing the AC output impedance of said line-driver amplifier from a first given level to a second given level when the level of said telephone input signals exceeds said predetermined value, thereby to reduce the gain variations of said line-driver amplifier with respect to variations in the impedance of said line over said given range.

4,002,853
VISUAL RING INDICATOR

Hans George Mattes, Ocean Township, Monmouth County, and Daniel Edward Oates, Fair Haven, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 13, 1975, Ser. No. 604,162
Int. Cl.² H04M *1/21*
U.S. Cl. 179—84 L **7 Claims**



1. A telephone station set having a visual ring indicator for informing a user that said station set has been rung, where said station set includes a switchhook and a ringing system comprising a clapper which vibrates in response to an incoming call, said apparatus comprising: an indicator element having at least an on and off position, said indicator element comprising: a mechanical link responsive to physical impact of said vibrating clapper for placing said indicator element in said on position; means for resetting said indicator element to said off

position in response to operation of said switchhook; and means for viewing said on and off positions of said indicator element.

4,002,854

LOUDSPEAKING TELEPHONE INSTRUMENTS

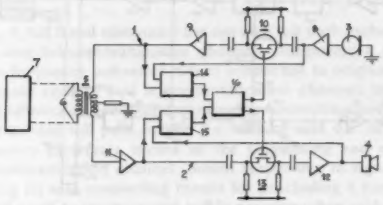
David John Penrose, Darlington, England, assignor to The General Electric Company Limited, London, England

Filed Sept. 22, 1975, Ser. No. 615,504

Claims priority, application United Kingdom, Sept. 27, 1974, 42099/74

Int. Cl.² H04M 9/08

U.S. Cl. 179—81 B 7 Claims



1. A loudspeaking telephone instrument including a voice switching arrangement by means of which in operation signals on a send path or a receive path selectively are substantially attenuated in dependence upon the relative amplitudes of the voice frequency signals appearing on said paths, the voice switching arrangement comprising a voltage comparator and respective rectifier circuit means to derive from said signals appearing on said send and receive paths unidirectional voltage signals for application to respective inputs of said comparator, wherein at least one of said rectifier circuit means comprises means to derive from the respective unidirectional voltage signal a voltage proportional to the mean level of that unidirectional voltage signal, and rectifier means to derive said respective unidirectional voltage signal from the voice frequency signals on the respective path and from said voltage proportional to said mean level, such that the effects of a continuing background noise on the level of said respective unidirectional voltage signal are reduced.

4,002,855

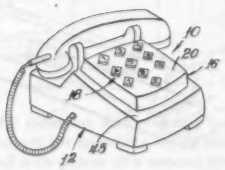
PUSH-BUTTON TELEPHONE ATTACHMENT

Jerome D. Schiffman, 116 Woodbine, Wilmette, Ill. 60091, and Bernard L. Kleinke, 934 Willson Drive, Des Plaines, Ill. 60016

Filed Sept. 24, 1974, Ser. No. 508,768

Int. Cl.² H04M 1/23

U.S. Cl. 179—90 K 10 Claims



1. An attachment adapted to be used with a push button telephone having an array of telephone push buttons, said attachment comprising:

a cup-shaped housing having an opened mouth adapted to fit over the array of push buttons of the telephone and to be secured in place thereover, said housing having a plate, said plate including an array of apertures extending therethrough, said plate having inner and outer faces;

an array of finger discs corresponding to at least some of the telephone push buttons for actuating them and bearing indicia on the front faces of said discs, said discs normally at least partially extending outwardly from the outer face of said plate, said discs having rear faces on the opposite side of said front faces; and

a series of elongated legs fixedly connected to said rear faces and slidably extending through said apertures to the telephone push buttons for actuating them selectively when depressed and alternatively maintaining said discs normally at least partially extending outwardly from the outer face of said plate, at least one of said legs having an axially-extending front portion disposed in axial alignment with its aperture in said plate and having a laterally extending intermediate portion connected at its forward end to said front portion and terminating in a foot portion adapted to engage one of the telephone push buttons.

4,002,856

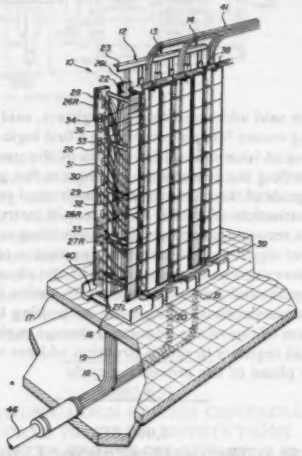
MODULAR DISTRIBUTION FRAME ASSEMBLY

William S. Sedlacek, Chicago; Edward S. Paluch, Elmwood Park, and William Andrew Brey, Schaumburg, all of Ill., assignors to Reliable Electric Company, Franklin Park, Ill.

Filed June 27, 1975, Ser. No. 591,037

Int. Cl.² H04Q 1/14

U.S. Cl. 179—98 10 Claims



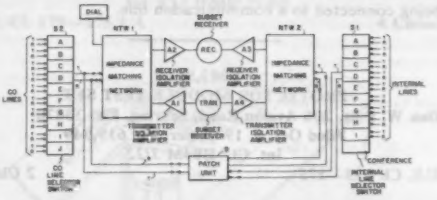
1. A modular distribution frame assembly comprising a vertically upstanding frame, a base structure, and a top structure, said base and top structures having means for securement to a subjacent and overhead supports, respectively, at least one of said structures being vertically extensible to accommodate varying spacings between said subjacent and overhead supports, a vertical array of protector blocks attached to one side of said frame, said protector blocks adapted for electrically conductive connection to subscriber lines, first and second vertical arrays of terminal blocks on the other side of said frame, said first terminal blocks having terminals thereon for electrical connection to said protector blocks, said second terminal block having terminals thereon for electrical connection to said central office equipment, means on said frame forming a main open vertical column between said protector blocks and said first and second terminal blocks, and interconnecting generally vertical jumper wires joining terminals of said first terminal block with the terminals of said second terminal block, said jumper wires being housed in said vertical column.

4,002,857

TELEPHONE CIRCUIT TO ELIMINATE USE OF A HOLD BUTTON

Richard Eugene Herlacher, Camp Hill, Pa., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Dec. 16, 1975, Ser. No. 641,201
Int. Cl.[2] H04M *1/72, 3/56*
U.S. Cl. 179—99 11 Claims



1. A telephone circuit to eliminate use of a hold button comprising:

a subset having a receiver and a transmitter for use by one party;

a plurality of central office lines connected to outside parties;

a plurality of internal lines connected to internal parties;

first means to couple said receiver and said transmitter to a selected one of said central office lines to enable a first two-way conversation between said one party and a selected one of said outside parties, said first means including a first network coupled between said transmitter and said receiver to reduce sidetones in said receiver;

second means to couple said receiver and said transmitter to a selected one of said internal lines to enable a second two-way conversation between said one party and a selected one of said internal parties, said second means including a second network coupled between said transmitter and said receiver to reduce sidetones in said receiver; and

third means coupled between said first means and said second means, said third means having a first state to enable said first and second conversations to be carried on simultaneously and to prevent said selected one of said outside parties and said selected one of said internal parties from hearing each other and a second state to selectively enable said one party, said selected one of said outside parties and said selected one of said internal parties to be placed in a two-way conference.

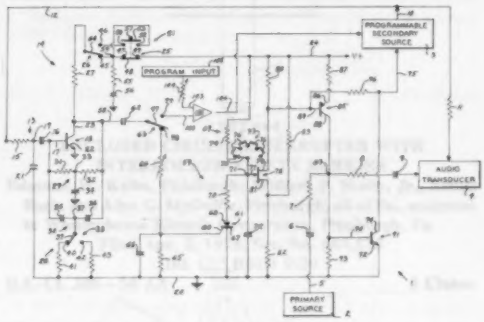
4,002,858

AUDIO PROGRAM SWITCHING APPARATUS

Edwin G. Giese, 1008 E. Fairy Chasm Road, Milwaukee, Wis. 53217

Filed Dec. 19, 1974, Ser. No. 534,163
Int. Cl.[2] G11B *31/00*
U.S. Cl. 179—100.1 C 4 Claims

1. An electrical control apparatus, comprising a transducer converting electrical audio signals to audio sound waves, a primary source connected through a connecting circuit to said transducer and supplying a primary output including a continuous primary audio program, a secondary source connected to said transducer and selectively supplying a secondary output including a secondary audio program of a predetermined time duration followed by a control signal outside of the audio frequency range, an amplifying transistor connected in common emitter configuration and having a base circuit connected to receive said secondary output and a collector circuit operatively connected to a power source, a feedback coupling said collector and base circuits and including a first feedback path having a first resistor and a first circuit portion connected to a system ground potential through a first capacitor and a second feedback path having a second capacitor and a second circuit portion connected to said ground potential through a second resistor, said amplifying transistor resonating in response to said control signal to provide a resonating output at said collector circuit, a controlled rectifier having a gating circuit operatively connected to said collector circuit and an anode circuit providing an output in response to said resonating output, a timing circuit including a selectively variable impedance operatively connected to said power source and to a timing capacitor through a junction circuit connected to said anode output circuit, said timing circuit responding to said



controlled rectifier and initiating a timing sequence of a predetermined time in response to said resonating output, a first switching circuit connected to said junction circuit and providing an output connected to said connecting circuit and operatively supplying said primary program to said transducer in response to said timing sequence initiation and operatively attenuating said primary program in response to the expiration of said predetermined time, and a second switching circuit connected to said first switching output and to said secondary source and operatively supplying said secondary output to said transducer and to said amplifying transistor in response to the expiration of said predetermined time.

4,002,859

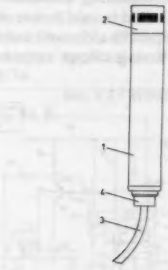
MULTI-MODE ELECTROSTATIC MICROPHONE CONSTRUCTION

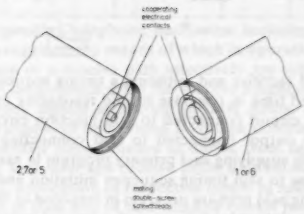
Karl Schoeps, Karlsruhe, and Joerg Wuttke, Pfinztal, Berghausen, both of Germany, assignors to Schalltechnik Dr. Schoeps, Karlsruhe, Germany

Filed Nov. 5, 1974, Ser. No. 521,150
Claims priority, application Germany, Nov. 8, 1973, 2355778
Int. Cl. H04r *1/00*
U.S. Cl. 179—146 R 16 Claims

1. A set of components connectable together to form different microphone constructions, comprising, in combination, a first unit containing a microphone amplifier having an electrical input provided with electrical input contact means, said first unit having a first connecting portion; a second unit containing an electrostatic microphone transducer having an electrical output provided with electrical output contact means, said second unit having a second connecting portion, said first and second connecting portions being so configured as to be detachably connectable to each other, with said electrical output contact means of said transducer and said electrical input contact means of said microphone amplifier being so disposed relative to said first and second connecting portions, respectively, that when the latter are connected to each other said electrical output contact means of said transducer becomes electrically connected to said electrical input contact means of said microphone amplifier; a third unit containing an impedance converter circuit having a high-impedance electrical input adapted for electrical connection to a microphone transducer and a low-impedance electrical output provided

with electrical output contact means, said third unit having a respective third connecting portion, said first and third connecting portions being so configured as to be detachably connectable to each other, with said electrical output contact means of said impedance converter circuit and said electrical





input contact means of said microphone amplifier being so disposed relative to said first and third connecting portions, respectively, that when the latter are connected to each other said electrical output contact means of said impedance converter circuit becomes electrically connected to said electrical input contact means of said microphone amplifier.

4,002,860

TRANSMITTING AND RECEIVING APPARATUS

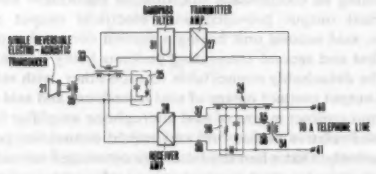
Masaaki Terai; Kazuhiko Kakehi, both Tokyo; Ryoichi Matsuda, Musashino, and Giichi Ito, Koganei, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Apr. 2, 1975, Ser. No. 564,544

Claims priority, application Japan, Apr. 4, 1974, 49-37326

Int. Cl.² H04B *1/52, 3/36*

U.S. Cl. 179—170 R **9 Claims**



1. Transmitting and receiving apparatus comprising a single reversible electro-acoustic converter acting as a transmitter and a receiver, and first and second 2-wire to 4-wire converters, the 2-wire side terminal pair of said first 2-wire to 4-wire converter being connected to said reversible electro-acoustic converter, the first terminal pair of the 4-wire side terminal pairs of said first 2-wire to 4-wire converter being connected to the first terminal of the 4-wire side terminal pairs of said second 2-wire to 4-wire converter through an amplifier for constituting a transmitting system, the second terminal pair of said 4-wire side terminal pairs of said first 2-wire to 4-wire converter being connected to the second terminal pair of the 4-wire side terminal pairs of said second 2-wire to 4-wire converter for constituting a receiving system, and the 2-wire side terminal pair of said second 2-wire to 4-wire converter being connected to a communication line.

4,002,861

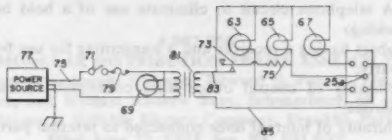
PROTECTOR MODULE TEST SET

Dan W. Putt, 206 Avalon Road, Sebring, Fla. 33870

Filed Oct. 6, 1975, Ser. No. 619,949

Int. Cl.² H04M *3/22*

U.S. Cl. 179—175 **2 Claims**



1. A test set for a telephone connector protector (17) module used in a telephone connector (11) for cable terminations, said telephone connector (11) having a multiplicity of five prong protective modules (17) plugged therein, each of said modules having a tip and a ring circuit (29, 31) with a tip, ring, and ground, long prong (21, 23, 25), and a tip and ring short prong (27, 28), one heat coil (33, 35) and a shunt switch (37, 39) coupled to the tip and ring circuits and the ground prong, said test set comprising in combination;

a. a rectangular box-like housing (55), with a front panel (59);

b. a receptacle (61) in the center of said panel for receiving a five prong module having tip ring and ground long plugs (21, 23, 25) and tip and ring short plugs (27, 28);

c. tip, alarm, and ring lamp sockets and lamps (63, 65, 67) in line in said panel above said receptacle (61), a clear switch (73), pilot lamp (69), power switch (71), in line in said panel below said receptacle;

d. a power line (75) connected to said housing (55) with a plug in unit (77);

e. a power line circuit connected to said plug-in unit including said power switch (71), a transformer primary and secondary (81), a pilot lamp (69) in parallel with said transformer primary and a fuse (79);

f. first and second side lines (85, 83) connected to said secondary, said first side (85) terminating in tip and ring short plugs of said receptacle (61);

g. a tip circuit connected between said second side (83) and said tip long plug having said tip lamp (63) in series therein;

h. a ring circuit connected between said second side (83) and said ring long plug having said ring lamp (67) in series therein;

i. an alarm circuit connected between said second side and said ground long plug having said alarm lamp (65) and a junction in series therein; and,

j. a clear circuit connecting said second side and said junction having said clear switch (73) and a high value resistor therein,

whereby, when a module to be tested is placed in said receptacle and the power switch is closed, the ring and tip lamps will light up if the module is in good order, the alarm light will not light up if there is no short, and if the clear switch is pressed the circuit closing should clear carbon dust in the modules, while if the tip or ring lamps

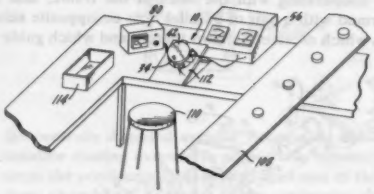
fail to light or if the alarm lamp remains lit, the module is defective.

4,002,862

SOUND AUDIT STATION AND METHOD OF TESTING ELECTRIC HORNS

Juris Turlais, Marion, Ind., assignor to United Filtration Corporation, Marion, Ind.

Filed Sept. 18, 1975, Ser. No. 614,496
Int. Cl.² H04R *29/00*
U.S. Cl. 179—175.1 A **4 Claims**



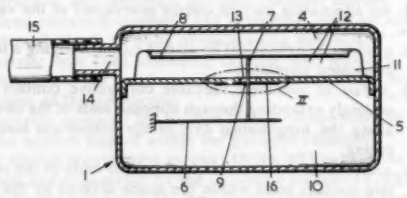
1. A sound-audit station for testing electric horns, comprising a sound-detecting fixture including an elongated progressive wave tube, a mass of sound-absorptive material within the progressive wave tube spaced from one end and substantially filling a partial length of the tube, and sound-detecting means interposed within the progressive wave tube between said one end and the mass of sound-absorptive material, a horn mounting associated with said one end of the progressive wave tube for positioning a horn being tested relative to said one end, said horn mounting including sound-absorptive material for substantially containing sound from a horn being tested within the progressive wave tube and horn mounting, a source of electric power, electrical connecting means between the source of electric power and the sound-detecting fixture, including means for operatively connecting the electrical connecting means to a horn being tested to actuate the horn, a display indicator associated with the sound-detecting means for presenting a direct readout of the correlated sound level of a horn being tested, a sound level amplifier operatively connected between the sound-detecting means and display indicator to adjust signals from the former for presentation by the latter, and an an annular electromagnetic noise interference shield disposed within the horn mounting around the sound-absorptive material for reducing electromagnetic interference during the testing of D.C. horns.

4,002,863

TRANSDUCER AND METHOD OF MAKING SAME

Harmen Broersma, Stoombootweg 9, Amsterdam-N., Netherlands

Filed Dec. 2, 1974, Ser. No. 528,803
Int. Cl.² H04R *1/28, 31/00*
U.S. Cl. 179—180 **2 Claims**



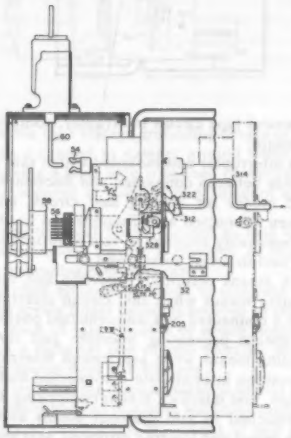
1. A method of making a hearing aid comprising a miniature transducer having a housing, an electromechanical motor in said housing, a partition subdividing said housing and having associated therewith a foil with a passage therethrough, and a linkage pin extending through said passage, which includes the steps of placing said linkage pin into said opening with clamping fit, and selecting the material of the linkage pin and said foil so that after initiating the operation of said electromechanical motor the outer surface of said linkage pin and the edges of said opening will wear each other out until they are just free of play.

4,002,864

ENCLOSED CIRCUIT INTERRUPTER WITH INTERLOCKED SAFETY BARRIER

Edmund W. Kuhn, Pittsburgh; William P. Matty, Jr., Bethel Park, and Alan G. McGuffie, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 2, 1975, Ser. No. 564,575
Int. Cl.² H01H *9/20*
U.S. Cl. 200—50 AA **3 Claims**



1. A drawout type circuit interrupter, comprising:
an enclosure;
load terminals connected to an electrical load;
line terminals connected to a source of electrical energy at high potential;
a drawout unit movably mounted within said enclosure and comprising a levering mechanism for moving said interrupter unit between connected and disconnected positions, said drawout unit comprising separable contacts bridging said load and line terminals and placing high potential upon components of said drawout unit when said drawout unit is in a connected position;
a vertical upstanding protective barrier of conductive material removably attached to said drawout unit; said barrier, when attached, being at ground potential and preventing all access to components at high potential; and
interlock means comprising catch means attached to said barrier and engaging means attached to said levering means, said engaging means mechanically capturing said catch means when said drawout unit is in any position other than a fully disconnected position, thereby preventing removal of said barrier when said drawout unit is in any position other than a fully disconnected position.

4,002,865

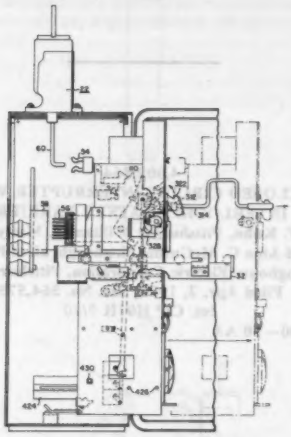
DRAWOUT TYPE CIRCUIT INTERRUPTER WITH INTERLOCKED LEVERING MECHANISM

Edmund W. Kuhn, and Alan G. McGuffie, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 2, 1975, Ser. No. 564,577

Int. Cl.² H01H 9/22

U.S. Cl. 200—50 AA **8 Claims**



1. A drawout type circuit interrupter, comprising:

an enclosure;

a circuit interrupter unit mounted within said enclosure and movable between connected and disconnected positions;

drawout means for moving said circuit interrupter unit between connected and disconnected positions;

means removably attached to said drawout means for operating said drawout means; and

interlock means permitting insertion and removal of said operating means when said circuit interrupter unit is in either a connected or a disconnected position, said interlock means preventing insertion and removal of said operating means when said circuit interrupter unit is in any position intermediate a connected and disconnected position, said interlock means comprising a shutter pivotally attached to said drawout means and movable between raised and lowered positions, said shutter comprising means for engaging said operating means to prevent insertion or removal of said operating means when said shutter is in a lowered position.

4,002,866

ELECTRIC SWITCHES

William E. Ward, Clanfield, England, assignor to Illinois Tool Works Inc., Chicago, Ill.

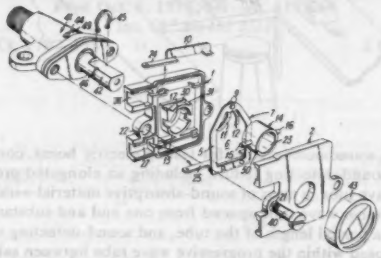
Filed Apr. 18, 1975, Ser. No. 569,528

Claims priority, application United Kingdom, Apr. 19, 1974, 17338/74

Int. Cl.² H01H 13/36

U.S. Cl. 200—67 D **11 Claims**

1. An electrical switch for a gas valve having a shaft for opening the valve by rotation of the shaft comprising a housing having a generally cylindrically-shaped hollow boss integrally formed thereon; a first contact member which is of resilient flexible material and includes a frame defining a central window, the frame lying generally in a plane and consisting of a base, two opposite sides, and a tip, the base being fixed in the housing and the remainder of the frame being movable; a fulcrum formed on said boss and aligned with the window and fixed in the housing; a second contact member, fixed in the housing adjacent to the tip of the first contact member; a stop fixed in the housing adjacent to the tip; and a hollow cylindrically-shaped actuating member having a central bore, the axis of which is transverse to the general plane of the frame, and the cross-section of which is aligned with the window; a control member adjacent said actuating member which may be reciprocated and rotated simultaneously, the actuating member being able to reciprocate in said boss and to be guided by said boss relatively to the housing in the direction of the axis of the bore, when said actuating member is contacted by said control member, and the actuating member having a pair of diametrically opposed pins aligned with each other and extending in opposite directions from said actuating member cooperating with the sides of the frame; said boss being formed with a pair of parallel slots on opposite sides of said boss which receive said pins therein and which guide said



pins so as to restrain the actuating member from rotating during actuation and deactuation of the switch, but which will allow for rotation of said shaft of said gas valve when said shaft is rotated by said control member; the first contact member including a tongue projecting into the window from adjacent to the tip of the frame, and terminating in an end which is in compressive engagement with the fulcrum, and the proportions of the switch being such that a predetermined stroke of the actuating member will cause the first contact member to snap from a first extreme position to a second extreme position, and release of the actuating member will enable the first contact member to snap back to the first extreme position, the tip making firm engagement with the second contact member when in one of the said extreme positions, and being spaced from the second contact member and in engagement with the stop when in the other of said extreme positions.

4,002,867

VACUUM-TYPE CIRCUIT INTERRUPTERS WITH CONDENSING SHIELD AT A FIXED POTENTIAL RELATIVE TO THE CONTACTS

Sidney J. Cherry, Elmira, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 302,952, Nov. 1, 1972, abandoned. This application Sept. 23, 1974, Ser. No. 508,373

Int. Cl.² H01H 33/66

U.S. Cl. 200—144 B **7 Claims**

1. An alternating current circuit interrupter of the vacuum type, including in combination:

a. a generally cylindrical insulating casing defining a highly-evacuated envelope;

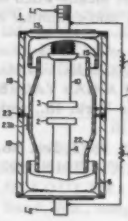
b. a pair of relatively movable conductive contact posts sealingly extending through opposed ends of the envelope along the longitudinal axis of the cylindrical insulating casing;

c. arc contact members disposed at the ends of the respective contact posts within the space defined by the cylindrical insulating casing;

d. a single centrally disposed metallic condensing shield supported from the cylindrical insulating casing and centrally disposed within the space defined by the cylindrical insulating casing about the arc contacts and the gap be-

tween the contacts when they are spaced apart to shield the insulating casing from vaporized metal from the contacts;

e. a resistive coating disposed on the interior or exterior surface of the insulating casing and electrically contacting



the centrally disposed metallic condensing shield, which resistive coating extends to and serially electrically connects the condensing shield to at least one of the contact posts whereby the potential on the condensing shield may be quickly dissipated through the resistive coating.

4,002,868

MECHANICALLY OPERATED ELECTRIC SWITCH, PARTICULARLY BREAKER CONTACT FOR AUTOMOTIVE IGNITION SYSTEMS

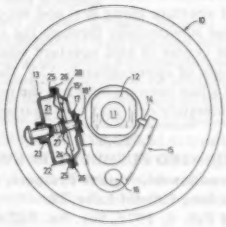
Helmut Jooss, Ditzingen; Hartmut Brammer, Stuttgart, and Helmut Funke, Munchingen, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Sept. 2, 1975, Ser. No. 609,448

Claims priority, application Germany, Sept. 14, 1974, 2444039

Int. Cl.² H01H *19/62*

U.S. Cl. 200—30 A **10 Claims**



1. Sealed electrical switch adapted for cooperation with an operating means (11, 12) located adjacent to, but spaced from the switch comprising

a housing structure (13) having rigid walls and including a movable membrane (24) forming another wall of said structure and defining a gas-tight chamber therein;

a fixed electrical contact (19) extending into and sealed through the fixed walls of the housing structure;

a carrier bolt (18) extending through and sealed to the membrane (24) and movable transversely to the major plane of the membrane;

a movable contact (20) carried by the carrier bolt (18) at the portion thereof within the gas-tight chamber;

and motion-transmitting means (15, 16, 17) coupled to the bolt and engageable by the operating means (11, 12) to move the bolt and guide it in contact opening and closing reciprocating movement comprising

a double-arm lever of approximately V shape pivoted approximately at the apex of the V, laterally with respect to the operating means (11, 12), and including the operating means in the angle between the arms of the V, one lever arm being shaped for cooperation with said operating means (11, 12), and the other lever arm acting without play on the carrier bolt (18), movement transferred to the carrier bolt being in a direction towards the operating means when movement of the bolt tends to open the contacts.

4,002,869

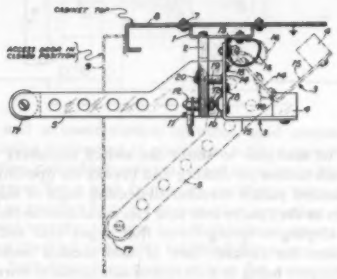
AUTOMATIC HIGH VOLTAGE GROUNDING DEVICE FOR PERSONNEL SAFETY

Philip Anthony Taccetta, Lanham, and Robert Michael Novak, Baltimore, both of Md., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed May 8, 1975, Ser. No. 575,681

Int. Cl.² H01H *3/16*

U.S. Cl. 200—61.7 **11 Claims**



1. An automatic high voltage grounding device to short high voltages within a cabinet to cabinet ground when a cabinet access door having a latch side is opened comprising:

a base plate secured to said cabinet adjacent said access door;

a high voltage terminal board secured to said base plate, said terminal board having a plurality of high voltage terminals extending therethrough;

a grounding plate pivotably secured to said base plate;

a plurality of spring finger contacts secured to said grounding plate, each of said plurality of spring finger contacts contacting a different one of said plurality of terminals when said access door is fully open;

an actuating lever having one end secured to said grounding plate and the other end engaging the inner surface of said access door to control the movement of said grounding plate to ground said plurality of terminals when said access door is fully opened and to remove ground from said plurality of terminals when said access door is closed, said lever losing contact with said access door when said access door is fully opened to ground said plurality of terminals; and

a counter weight secured to said grounding plate and providing a positive movement of said grounding plate and a positive grounding contact between said plurality of terminals and said plurality of spring finger contacts when said access door is fully opened to protect personnel from said high voltages on said plurality of terminals.

4,002,870

ARCING CONTACT FOR A HIGH CURRENT SWITCH

Bernard L. Phillips, Norwood, Mass., assignor to Arrow-Hart, Inc., Hartford, Conn.

Filed July 18, 1974, Ser. No. 489,753

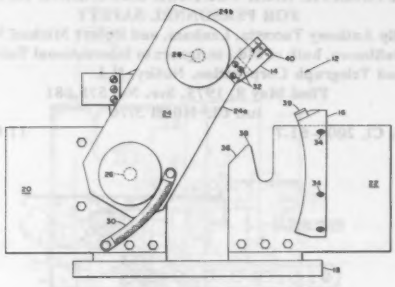
Int. Cl.² H01H *33/12*

U.S. Cl. 200—146 R **14 Claims**

1. An arcing contact for a high current switch having a pair of relatively movable switch members that move in a sliding face-to-face engagement to close and open the switch, comprising

a set of resilient laminations in adjacent, face-to-face contact, each having a fixed end portion, a body portion and a free end portion that is bent at an angle substantially perpendicular to the body portion,

said fixed end portion being mounted on a face of a first switch member of said pair so that the end surfaces of the free end portions of each lamination are in electrical connection with a contact face of a second switch member of said pair to shunt the switch members when the switch makes on closing and breaks on opening, and



said second switch member deflecting each of said laminations as they move into said electrical connection thereby developing a spring force that urges said end surfaces against the contact face of said second member, said deflection being in a direction substantially normal to the direction of movement of said switch members and said laminations.

4,002,871

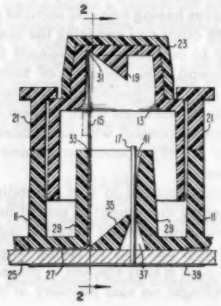
COLUMN LEAF SPRING PUSH-BUTTON SWITCH FOR USE IN A KEYBOARD

Dewey M. Sims, Jr., Westland, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Dec. 20, 1974, Ser. No. 534,825

Int. Cl.² H01H *3/12*

U.S. Cl. 200—159 A **15 Claims**



1. A switching apparatus comprising:

resiliently deformable electrically conductive columnar means for resiliently deflecting into a bowed configuration upon actuation, said columnar means being capable of deflecting only in a lateral direction with respect to its undeflected configuration;

actuating means for causing said columnar means to be selectively and forcibly deflected into a bowed configuration;

elongated, resilient contact means parallelly disposed with respect to said columnar means for engagement by said columnar means when said columnar means is forcibly actuated into a bowed configuration and for cooperating with said columnar means to complete a switching action; and

elongated damping means substantially parallelly disposed and adjacent to said elongated contact means to cooperate with said contact means when said contact means is forcibly engaged by said columnar means.

4,002,872

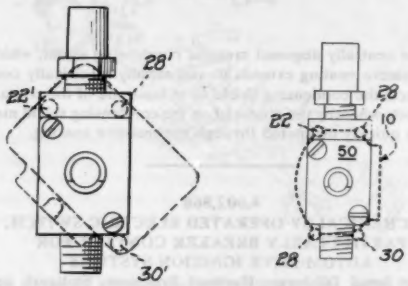
ELECTRICAL SWITCH HOUSING DETACHABLY MOUNTABLE ON A GAS VALVE STRUCTURE

Frank B. Desio, Melrose Park, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed June 18, 1975, Ser. No. 588,126

Int. Cl.² H01H *9/02*

U.S. Cl. 200—294 **6 Claims**



1. In an electrical switch assembly including a housing having an outside surface and an aperture therethrough and an operating member rotatably mounted in said aperture of said housing for receiving a control shaft the improvement comprising a pair of mounting posts of electrically insulating material that extend in a substantially normal direction from said outside surface of said housing with said posts of said pair of posts being positioned substantially equidistant from the center of the said aperture along first and second radial lines, each of which pass substantially through the center of one of said posts and the center of said aperture wherein said radial lines make an angle of approximately 135° therebetween the chordal length of a line running between the posts of each pair of posts is approximately one and one-quarter inches.

4,002,873

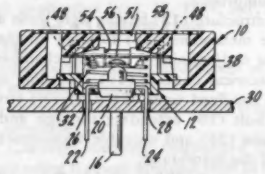
ILLUMINATED PUSHBUTTON SWITCH

Raymond F. Lewandowski, Mount Prospect, Ill., assignor to Oak Industries Inc., Crystal Lake, Ill.

Filed Feb. 6, 1975, Ser. No. 547,436

Int. Cl.² H01H *9/00*

U.S. Cl. 200—314 **1 Claim**



1. A pushbutton switch including a base and a button telescopically mounted on the base, at least a portion of said button being light transmissive, spaced terminals extending outwardly from the base and having portions positioned within the base, spring means normally biasing the button away from the base,

a contact having a plurality of outwardly extending substantially co-planar arms positioned between the base and

button, certain of said arms being disposed for contact with said terminal portions, the remaining arms being disposed for contact by said button, means on the button for contacting said remaining arms to move said certain arms into contact with said terminal portions,

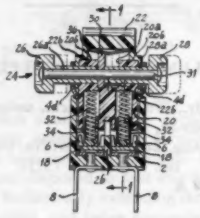
said substantially co-planar arms being joined together in a central area, an opening generally in the center of said central area, a light emitting diode positioned within said base and on the side of said contact away from said button, said light emitting diode being positioned in direct alignment with said contact opening and said light transmissive button portion.

4,002,874

DOUBLE-THROW ROCKER SWITCH WITH SELECTIVE LOCKOUT MEANS

Harry W. Brown, Big Bend, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Mar. 19, 1975, Ser. No. 559,673
Int. Cl.² H01H *21/50*
U.S. Cl. 200—321 **10 Claims**



1. A double-throw rocker switch with selective lockout means comprising:

a switch housing having an opening at the top;

stationary contacts within said housing connected to terminals outside said housing;

movable contact means in said housing operable to be moved into engagement with selected stationary contacts;

a switch operator comprising a double-throw rocker portion outside said housing adapted to be actuated from a center position in one or another direction by the user, a contact actuator portion coupled for double-throw rocking movement with said rocker portion and extending through said opening into said housing for moving said movable contact means, and pivoting means pivotally supporting both of said portions for double-throw rocking movement on said housing;

and selective lockout means including mounting means therefor rendering the same shiftable into one or another selective position for limiting rocking movement of said rocker portion to said one or said other direction as determined by the selective position of said lockout means.

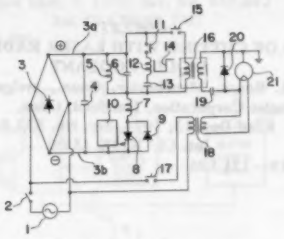
4,002,875

HIGH FREQUENCY HEATING APPARATUS

Mitsuyuki Kiuchi, Toyonaka; Shigeru Kusunoki, Yamato Koriyama; Hiroshi Fujieda, Nara; Keizo Amagami, Takatsuki, and Tadao Toyooka, Toyonaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 10, 1975, Ser. No. 621,620
Claims priority, application Japan, Oct. 18, 1974, 49-120757; Oct. 18, 1974, 49-120758
Int. Cl.² H05B *9/06*
U.S. Cl. 219—10.55 B **16 Claims**

1. A high frequency heating apparatus which comprises a unidirectional power source for converting input from an A.C. power source to D.C. voltage, an inverter for converting output from said unidirectional power source into high frequency power, a control circuit for said inverter, an induction heating coil for heating through electrical induction by high frequency magnetic flux, a high frequency oscillator which is energized by high voltage for radiating microwave energy, and a heating cavity in which the microwave energy from said high frequency oscillator is confined for effecting the dielectric heating, said inverter including at least one thyristor connected to a series-resonance circuit which has at least a commutation



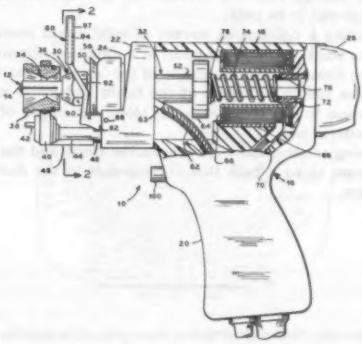
capacitor and a commutation inductor, said commutation capacitor being connected in parallel to a filter capacitor and said induction coil which are connected in series, with a step-up transformer for a high frequency oscillator being further connected in parallel to said commutation capacitor, thereby enabling said inverter to serve as a high voltage power source for applying the high voltage to said high frequency oscillator and also a high frequency power source for energizing said induction heating coil.

4,002,876

STUD WELDING TOOL WITH RETRACTION MECHANISM

Howard N. Wieland, Jr., Amherst, Ohio, assignor to TRW Inc., Cleveland, Ohio

Filed June 30, 1975, Ser. No. 591,755
Int. Cl.² B23K *9/20*
U.S. Cl. 219—98 **7 Claims**



1. In a tool for welding a stud to a workpiece, a tool body, a chuck leg supported for longitudinal movement with respect to said body, a chuck, means connecting said chuck to an end of said chuck leg with said chuck extending beyond a forward end of said tool body, resilient means in said tool body for urging said chuck leg toward a forward position, means in said tool body for holding said chuck leg and said chuck leg in a retracted position, a lever located in front of said tool body and engageable with a portion of said chuck leg for moving said chuck leg and said chuck from a forward position to the retracted position, said lever having an opening therein through which said chuck leg extends, means pivotally supporting said

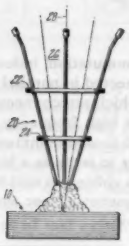
lever at one side of said opening by said tool body, and said lever having a handle extending to the side of said opening opposite said pivot means.

4,002,877

METHOD OF CUTTING WITH LASER RADIATION AND LIQUID COOLANT

Conrad M. Banas, Manchester, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 13, 1974, Ser. No. 532,566
Int. Cl.² B23K *15/00*
U.S. Cl. 219—121 LM **5 Claims**



1. The method of cutting a multilayer stack of sheet material along a desired pattern including the steps of:

providing a low mode beam of laser radiation having a symmetric intensity profile across its axis of propagation;

focusing the beam to a focus point on the multilayer stack to produce an energy intensity distribution with an inner region having an energy intensity sufficient to vaporize the sheet material in its path and an outer region having an energy intensity insufficient to vaporize the sheet material in its path;

directing a continuous stream of solid liquid coolant onto the stack at the focus point in a direction approximating the direction of propagation of the beam to absorb energy from the outer region of the beam and avoid interlayer fusion to the sheet material along the edges of the cut pattern; and

causing relative motion between the stack and the focused beam along a path that corresponds to the desired pattern.

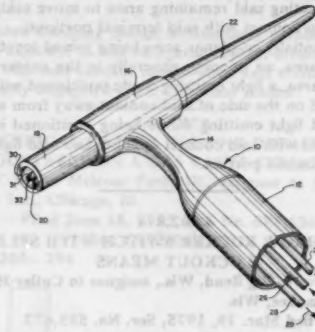
4,002,878

GAS TUNGSTEN ARC WELDING ELECTRODE

John A. Disney, Orem, Utah, assignor to Utah State University Foundation, Logan, Utah

Filed July 25, 1975, Ser. No. 599,216
Int. Cl.² B23K *9/24*
U.S. Cl. 219—121 P **11 Claims**

9. An improved working tip for a nonconsumable electrode comprising a narrow annular ring on the face of the working tip, the ring being formed adjacent the circle of intersection of a taper with the face, the narrow annular ring having an area less than the area of electron emission at the current limitation of the electrode thereby forcing the area of electron emission



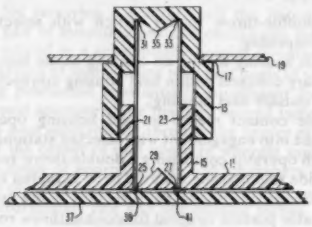
to include electrode surface area on the working tip adjacent the narrow annular ring.

4,002,879

DOUBLE COLUMN LEAF SPRING PUSH-BUTTON SWITCH

Dewey M. Sims, Jr., Westland, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Aug. 26, 1975, Ser. No. 607,894
Int. Cl.² H01H *13/52*
U.S. Cl. 200—159 A **15 Claims**



1. An electrical switch assembly for tactile manipulation comprising:

a rigid planar member;

conducting means on said rigid planar member;

a plurality of electrical contacts comprising resilient columnar biasing means each having an upper end and a lower end and a medial portion, said columnar biasing means each being mounted on said rigid planar member with respective lower ends of said columnar biasing means engaging said conducting means, said columnar biasing means resiliently bowing toward each other into contacting engagement at their respective medial portions when actuated while maintaining constant distances between their respective upper and lower ends, said contacting medial portions completing an electrical conductive path when engaged;

means acting on the upper ends of said columnar biasing means when tactile pressure is applied thereto for downward movement to actuate said opposing columnar biasing means to bow towards each other; and

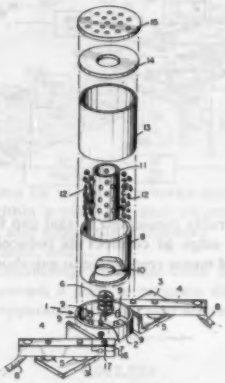
limiting means in juxtaposition with said actuating means for insuring that said columnar biasing means bow only toward each other when actuated by said actuating means, said resilient columnar biasing means restoring said actuating means when pressure is removed therefrom.

4,002,880

EVAPORATION SOURCE

Ernest A. Davey, Peabody, Mass.; Norman A. Mathieu, Exeter, N.H., and Edward D. Parent, Hamilton, Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed Aug. 13, 1975, Ser. No. 604,507
Int. Cl.² A61L 3/00
U.S. Cl. 219—275 2 Claims



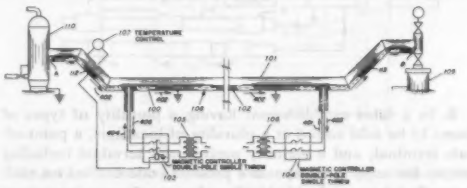
1. An evaporation source for the vacuum deposition of sublimating material comprising: a furnace base assembly including two bus bars and a cup holder; an upright coiled tungsten wire heater disposed in said cup holder and having two legs, each leg horizontally extending through a clearance hole in said cup holder and being connected to a bus bar; a cylindrical cup supported on said assembly slightly above the horizontally extending portions of the heater legs and surrounding said heater; and sublimating material disposed in said cup surrounding, and spaced from, said heater.

4,002,881

SYSTEM FOR CONTROLLING ELECTICAL POWER IN AN INTERNAL WIRE IMPEDANCE HEATING SYSTEM

James M. West, Englewood, Colo., assignor to Chevron Research Company, San Francisco, Calif.

Filed June 13, 1974, Ser. No. 479,000
Int. Cl.² H05B 1/02; F24H 1/10; F16L 53/00
U.S. Cl. 219—301 12 Claims



1. In combination with an apparatus for electrically heating a fluid in a pipe of the type wherein a ferromagnetic pipe for the fluid has an insulated wire means for conducting alternating current extending within, along, adjacent and electrically in series with a predetermined length of said pipe; the improvement comprising:

a plurality of voltage transformers each having at least a primary and secondary winding;

each of said secondary windings being connectable in said series circuit with each other and said ferromagnetic pipe by predetermined lengths of said insulated wire means;

means for connecting said primary windings to an alternating current source of power, and

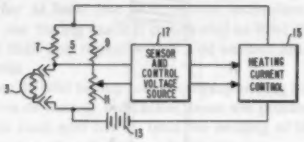
regulating means responsive to the temperature of the fluid in the pipe for regulating power output to said series circuit from selected ones of said transformers to selectively control current flow in said series circuit in response to the temperature of the fluid in said pipe.

4,002,882

HEATING CIRCUIT

Charles W. McCutchen, 5213 Acacia Ave., Bethesda, Md. 20014

Filed Mar. 5, 1975, Ser. No. 555,642
Int. Cl.² H05B 1/02
U.S. Cl. 219—499 11 Claims



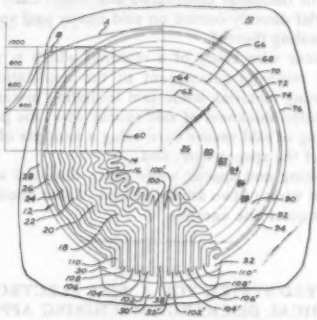
8. A device of the character described in claim 4 in which said device is connected to said glowplug by removable leads and in which the direct current for powering said device is derived from the charge in a large capacitor which is coupled to said direct current source through said glowplug, said removable leads and a diode, so that the device draws no standby current when said removable leads have been disconnected from said glowplug.

4,002,883

GLASS-CERAMIC PLATE WITH MULTIPLE COIL FILM HEATERS

Bohdan Hurko, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed July 23, 1975, Ser. No. 598,243
Int. Cl.² H05B 3/16
U.S. Cl. 219—543 12 Claims

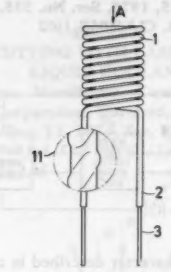


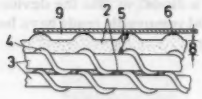
1. An electrical heating unit comprising a thin plate of high electrical resistivity and high dielectric strength and relatively good thermal conductivity, a plurality of electrical resistance thin film conductors of less than 0.001 inch thickness in physical contact with a surface of said plate, said conductors being of generally symmetrical looped configuration to form a relatively small unheated central area and a relatively large heated area, one terminal end of each loop being joined to a first common terminal strip and the other teminal end of each loop being joined to a second common terminal strip, the length of each conductor being of substantially equal length and of the same resistivity per ohm square and hence of equal watts density in order to obtain a generally uniform temperature distribution over the heating unit.

4,002,884
HEATER ELEMENT FOR AN INDIRECTLY HEATED CATHODE

Eberhard Weiss, Stuttgart, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Jan. 24, 1975, Ser. No. 543,724
Claims priority, application Germany, Jan. 30, 1974, 2404362
Int. Cl.² H05B 3/10
U.S. Cl. 219—552 2 Claims





1. A heating element for an indirectly heated cathode comprising:

a heating wire having a plurality of closely wound turns and a spacer wire wound around said heating wire having a thickness providing a spacing between adjacent turns of said heating wire which is equal to the thickness of the spacing wire;

a layer of thermally conductive and electrically insulating material directly coated on said heater and spacer wires and sealing thereof,

said spacer wire being of a material which is capable of being removed subsequent to the application of said insulating material, while said insulating material retains the added thickness of said spacer wire, the pitch of the winding of said spacer wire being a multiple of the thickness of the spacer wire, and

said heating and spacer wires being disposed so that the spacer wires of two adjacent turns of said heating wire do not contact one another.

4,002,885
SERVO FEED SYSTEM FOR A WIRE ELECTRODE TYPE ELECTRICAL DISCHARGE MACHINING APPARATUS

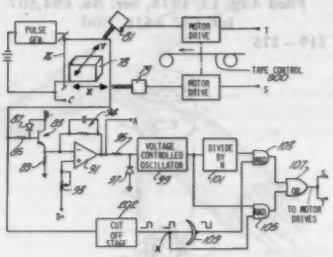
Oliver A. Bell, Jr., Mooresville, and Randall C. Gilleland, Statesville, both of N.C., assignors to Colt Industries Operating Corporation, New York, N.Y.

Filed Feb. 21, 1975, Ser. No. 551,957
Int. Cl.² B23P 1/08
U.S. Cl. 219—69 G 20 Claims

1. A servo feed system for an electrical discharge machining apparatus having a wire electrode and a workpiece whose relative movement is controlled by at least one electrically operated stepping motor, wherein the improvement comprises:

a voltage controlled oscillator having an input voltage from the gap representative of gap voltage and having connected to said motor a pulse output whose frequency is a function of the input voltage;

a divide-by-N stage operably connected between the output of said oscillator and the motor for predetermining a reduced frequency of pulses from said pulse output to be provided to said motor; and

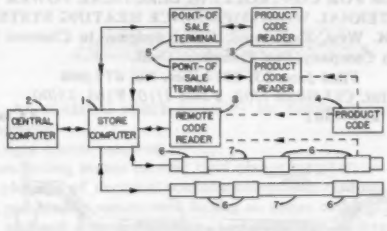


a network operably connected to said gap for enabling the divide-by-N stage to connect its reduced frequency of pulses to said motor responsive to gap short circuit condition.

4,002,886
ELECTRONIC PRICE DISPLAY UNIT

Ronald Murl Sundelin, 5 Sunset West, Ithaca, N.Y. 14850

Filed June 20, 1975, Ser. No. 588,866
Int. Cl.² G06K 7/14; G09F 3/20; B65G 1/02; H04Q 5/16
U.S. Cl. 235—61.7 R 12 Claims



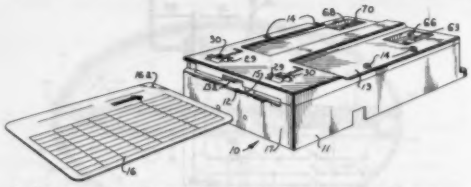
8. In a sales establishment having a plurality of types of items to be sold stored at a plurality of locations, a point-of-sale terminal, and a memory means, said terminal including means for sensing a respective product code carried on each item of each type of said plurality of types of items, interrogating said memory means to obtain data stored in said memory means for each sensed product code, and means for totalizing data obtained from the sensing of a plurality of said product codes, the combination of: a plurality of display units located at respective ones of said locations to be associated with respective ones of said types of items; a signal bus means extending from said memory means to each of said display units; each of said display units carrying coded externally-sensible indicia identifying said display unit and its fixed internal address; and a portable reader means for sensing the coded indicia of each display unit and the product code of the type of such items associated with said display unit and transmitting signals representing said coded indicia and product code to said memory means.

4,002,887

DIGITAL AREA NAVIGATION SYSTEM AND COMBINED MAGNETIC CARD READER AND ENCODER

Blaine N. Ouimette, Independence, Mo., assignor to King Radio Corporation, Olathe, Kans.

Filed Apr. 18, 1975, Ser. No. 569,573
Int. Cl.² G06K *7/08;* **G11B** *15/00*
U.S. Cl. 235—61.11 D **41 Claims**



1. An apparatus for use in an avionics system, said apparatus mounted within a pilot operated aircraft for processing data on a card, said apparatus comprising:

a read-write head, and

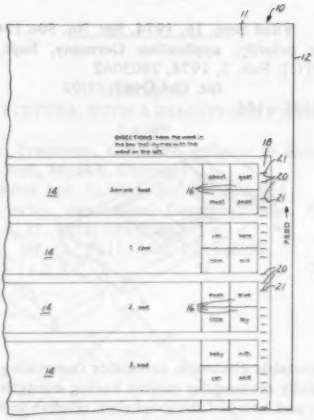
means interconnecting said read-write head within said system to permit a pilot to program data on said card, using said apparatus while in said aircraft.

4,002,888

TEST FORM FOR USE WITH A TEST SCORING APPARATUS

Richard E. Jahnke, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 17, 1975, Ser. No. 569,311
Int. Cl.² G06K *19/00;* **G09B** *7/06*
U.S. Cl. 235—61.12 N **8 Claims**



1. A test form for use with a test scoring apparatus of the type for sensing the presence of indicia in answer indication areas on the test sheet, said test form comprising:

a. a generally rectangular shaped sheet of paper or like material having longitudinal and transverse axes, and at least one generally straight edge parallel with one of said axes, said straight edge providing a reference edge for guiding the movement of the paper through said sensing apparatus;

b. a series of question locations indicated on said sheet of paper with each question location having a number of answer indication areas indicated on said sheet in which indicia can be entered, said number of answer indication areas of each question location being spaced to form transverse rows generally perpendicular to said straight edge of the sheet and/or being spaced to form longitudinal columns generally parallel with the straight edge of the sheet, and said series of question locations being spaced with answer indication areas therein being aligned with similar answer indication areas of other question locations to form longitudinal columns generally parallel with said straight edge of the sheet; and

c. a timing mark column generally parallel to said straight edge of the sheet containing a given number of timing marks which is greater than the number of rows of answer indication areas, with one of the timing marks being positioned in relation to each row of answer indication areas to time the sensing of each answer indication area;

wherein the improvement comprises

the spacing of the timing marks in relation to the longitudinal dimensions of the answer indication areas being such that for at least one said answer indication area, more than one timing mark is positioned to time the sensing of more than one region within said answer indication area; wherein

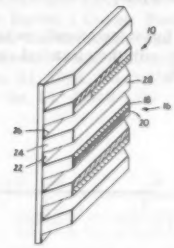
a number of said timing marks corresponding to the number of rows of answer indication areas are positioned in relation to each said row to time the sensing of the longitudinal center of each answer indication area.

4,002,889

SELF-CLEANING LABEL FOR AUTOMATIC OBJECT IDENTIFICATION SYSTEM

Sigurd Hoyer-Ellefsen, Locus Valley, N.Y., assignor to Servo Corporation of America, Hicksville, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,560
Int. Cl.² G06K *19/06, 9/00*
U.S. Cl. 235—61.12 N **6 Claims**



1. In an automatic object identification system of the type comprising a label made up of a backing member and a plurality of stripes of reflective material secured to said member, means for directing a beam of light on said stripes, and means for scanning the label to receive energy reflected from the individual stripes and generate an electrical system in response thereto the improvement comprising: a plurality of spaced apart protuding fins extending across said backing member, each of said fins having a rear surface directed toward said backing member and a front surface directed away from said backing member, said stripes of reflective material being affixed to said fins whereby the flow of air past said fins serves to prevent the settling of particulate matter on said stripes.

4,002,890

METHOD OF CHARGING FUEL COSTS AMONG THE VARIOUS APARTMENTS IN AN APARTMENT HOUSE OR THE LIKE AND SUITABLE DEVICES IN THIS CONNECTION

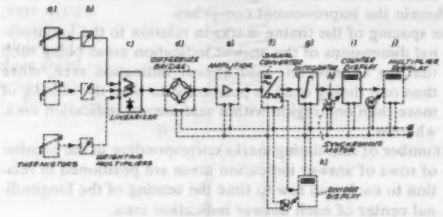
Karl Filip Einar Welin, Lidingo, Sweden, assignor to Einar Welins Patenter Kommanditbolag, Lidingo, Sweden

Filed July 30, 1975, Ser. No. 600,231

Claims priority, application Sweden, Aug. 1, 1974, 7407284

Int. Cl.² G06G *7/56*

U.S. Cl. 235—151.3 **18 Claims**



6. A device for an equitable allocation of heating costs in an apartment building or the like equipped with a central heating plant common to a number of individual consumers (apartments), characterized in that the allocation of said costs is made dependent on the heat comfort really enjoyed by the consumers concerned by being based upon a representative instantaneous value of the air temperature (average temperature) in the apartment in question, comprising:

a certain number of temperature sensors placed in the individual apartments to establish a representative instantaneous air temperature (the average apartment temperature measured at one or several representative points),

weighting means connected to each of said temperature sensors, said weighting means comprising electrical resistors having values chosen to regulate the effect each individual temperature sensor with respect to the area it represents in producing a signal representing the total value measured for each apartment,

a signal converter for each individual apartment connected to receive the signals representing the measured values,

an electric integrating device for each individual apartment connected to integrate the output of said signal converter, and

coupling means for automatically switching on said device simultaneously with the electrical equipment of the central heating plant.

4,002,891

MIXER CONTROL SYSTEM

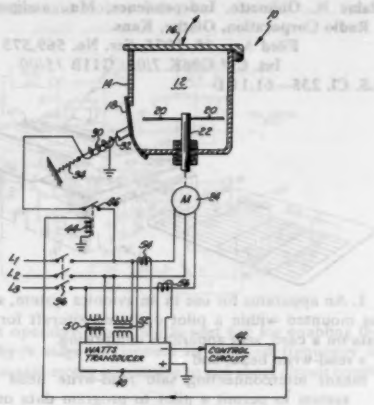
John Paul Porter, Cuyahoga Falls, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Aug. 13, 1975, Ser. No. 604,241

Int. Cl.² B29B *1/04;* **B29H** *1/10*

U.S. Cl. 235—151.12 **13 Claims**

1. Apparatus for use with a fluidizing mixer having means for mechanically working material and electrically energized drive means for driving said working means such that electrical energy is expended as work is performed on said material, means for sensing the electrical energy expended as work is performed during a work cycle of operation on said material and providing an electrical energy signal having a value in accordance therewith, and means for terminating a said work cycle of operation when the amount of energy expended to work said material decreases by a given amount.



4,002,892

PORTABLE CALCULATOR

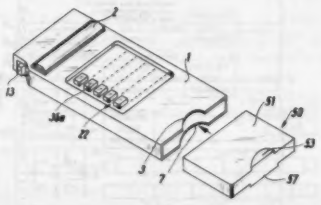
Adolf H. Zielinski, Haidgraben 101, 8012 Ottobrunn, Germany

Filed Sept. 16, 1974, Ser. No. 506,196

Claims priority, application Germany, Sept. 15, 1973, 7333551[U]; Feb. 2, 1974, 2405062

Int. Cl.² G06F *15/02*

U.S. Cl. 235—156 **3 Claims**



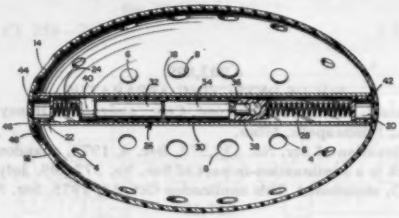
1. A portable electronic calculator comprising a housing of substantially rectangular outline having a length greater than its width and being of shallow height relative to its width, said housing having an end opening receptacle at one end thereof surrounded by top, bottom and side walls, a first printed circuit board retained in said housing inwardly of said receptacle and having connected thereto a keyboard, an electronic arithmetic unit, and a multi-digit display unit, said housing having appropriate areas for visual access to said display unit and for manual access to said keyboard, a second printed circuit board, and electrical supply unit on said second printed circuit board, said electrical supply unit and said second printed circuit board being movable into and out of said receptacle and positioned thereon by said walls, and plug- and-socket connection means between said first and second printed circuit boards and automatically engaging and disengaging upon insertion and withdrawal of said second printed circuit board and electrical supply unit said second printed circuit board and said electrical supply unit being housed in a rectangular block fitting within said receptacle.

4,002,893

ILLUMINATED PLAYBALL

Nelson F. Newcomb, and Nelson F. Newcomb, Jr., both of Mirror Lake, N.H. 03853

Filed Oct. 6, 1975, Ser. No. 620,011
Int. Cl.² F21V 33/00; A63H 33/26
U.S. Cl. 240—6.4 R 10 Claims



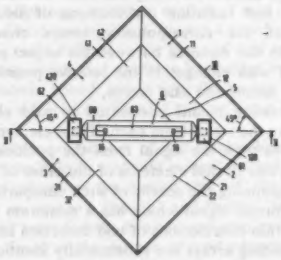
1. A hollow ball having a self-supporting wall made of translucent plastic,
first and second diametrically oppositely disposed sockets in the said ball,
a light transmitting self-supporting tube containing a light source and having its ends in said sockets,
a first hole in said wall closely adjacent the first of said sockets and large enough to permit passage of said tube therethrough.
said wall and said tube together capable of sufficient distortion to permit the moving of one end of said tube from its position in said first socket to a position in said first hole whereby said tube and light source may be withdrawn from said ball.

4,002,894

LIGHTING FIXTURE WITH A DIAGONALLY ARRANGED LAMP

Harry Kintz, Traunreut, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 7, 1975, Ser. No. 565,955
Claims priority, application Germany, Apr. 8, 1974, 2417100; Feb. 27, 1975, 2508580
Int. Cl.² F21L 7/00; F21Y 7/00
U.S. Cl. 240—11.2 A 7 Claims



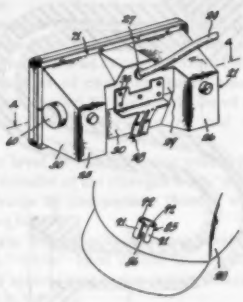
1. In a lighting fixture for discharge lamp of high brightness, said lamp being of the type having a linear inner bulb containing a burning arc, with a reflector in the form of a truncated pyramid with a rectangular light egress opening, the improvement comprising means for supporting the discharge lamp within the reflector so that the principal radiation directions of the lamp which are perpendicular to the longitudinal axis of the inner bulb point toward two diametrically opposed corners of the reflector.

4,002,895

ILLUMINATING APPARATUS

Albert E. Ketler, Indiana; Ronald P. Campbell, Latrobe, and George Shacreaw, Blairsville, all of Pa., assignors to Ocean Energy, Inc., Blairsville, Pa.

Division of Ser. No. 462,886, April 22, 1974, Pat. No. 3,953,725. This application June 6, 1975, Ser. No. 584,621
Int. Cl.² F21L 3/00, 15/08
U.S. Cl. 240—60 5 Claims



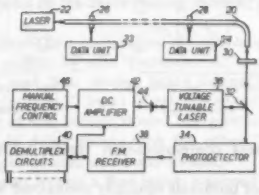
1. In combination:
a hard hat of the type worn by workers in hazardous occupations, said hat having a transversely curved front portion,
an oblong housing formed of light weight material,
a fluorescent tube lamp mounted within said housing to extend parallel with the longer axis thereof,
said housing having an elongated opening in its front wall aligned with said tube lamp to pass light rays, and said housing having its rear wall inwardly recessed to receive the transversely curved front portion of said hard hat, and
means connecting said housing to said hard hat with said longer axis extending generally horizontally when said hat is worn in normal manner by a worker.

4,002,896

TELECOMMUNICATION SYSTEM

David Evan Naunton Davies, 1 Copper Beach Close, Boxmoor, Hemel, Hempstead, Hertfordshire, and Stuart Alexander Kingsley, 43, Rostrevor Avenue, London, both of England

Filed Jan. 21, 1975, Ser. No. 543,224
Int. Cl.² H04B 9/00
U.S. Cl. 250—199 7 Claims

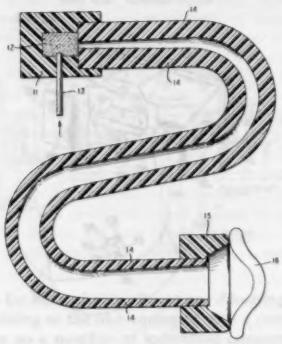


3. A telecommunications system comprising a highway formed from an optical fibre, a source of coherent electromagnetic radiation of optical frequency at one end of the highway, a modulator comprising a source of acoustic energy and a body of material having a high acoustic impedence adapted to focus acoustic waves on to the surface of the fibre at an intermediate position on the highway, and demodulating means connected to the other end of the highway.

4,002,897
OPTO-ACOUSTIC TELEPHONE RECEIVER

David Allmond Kleinman, Lebanon, and Donald Frederick Nelson, Summit, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 12, 1975, Ser. No. 612,761
Int. Cl.² H04B 9/00
U.S. Cl. 250—199 13 Claims

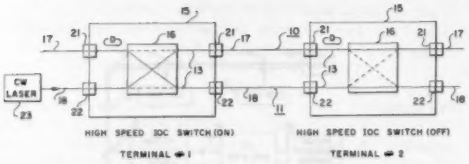


1. Apparatus which comprises
a. a hollow chamber of the order of 0.001 cm^3 in volume,
b. a first aperture in said chamber for the entry of light signals;
c. light absorbing means for absorbing the light located in said chamber; and
d. a second aperture in said chamber for the exit of acoustic signals into a hollow tube in accordance with the light signals, said acoustic signals having been generated in the chamber and said hollow tube adapted for acoustically transmitting said acoustic signals from a relatively narrow input end to a relatively wide output end.

4,002,898
SINGLE MODE LASER MULTITERMINAL OPTICAL DATA COMMUNICATION SYSTEM

A. Fenner Milton, Washington, D.C., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 26, 1976, Ser. No. 652,253
Int. Cl.² H04B 9/00
U.S. Cl. 250—199 3 Claims

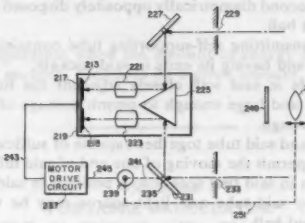


1. An optical communication system which includes in combination:
a plurality of terminals optically connected with each other by a single fiber communication line and a single fiber distribution line;
each of said terminals including a communication channel optical waveguide and a distribution channel optical waveguide with said distribution channel optical waveguide optically connected with said single fiber distribution line and said communication channel optical waveguide optically connected with said single fiber communication line;
a continuous wave laser for producing a light beam;
a single mode optical fiber interconnecting said laser light output with said distribution channel of one terminal; and
a light detector at each terminal for detecting light on said communication channel thereby receiving any information on the communication channel.

4,002,899
FOCUS DETECTING APPARATUS

Norman L. Stauffer, Englewood, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 529,573, Dec. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 377,809, July 9, 1973, abandoned. This application Oct. 31, 1975, Ser. No. 627,607
Int. Cl.² G01J 1/20
U.S. Cl. 250—201 44 Claims



1. Apparatus for providing a measure of the distance between the apparatus and an object, comprising
a plurality of radiation responsive elements formed on a single planar substrate and divided into two similar coplanar detector arrays lying immediately adjacent each other, all of the elements in each of said arrays being closely spaced along a line thereof, each of said elements being arranged to provide an electrical signal representative of the intensity of radiation impinging thereon,
first auxiliary means defining a first optical path for radiation from the object and for forming a first detection image thereof on solely one of said arrays,
second auxiliary means defining a second optical path for radiation from the object and for forming a second detection image thereof on solely the other of said arrays, the positions and radiation distributions of said detection images on the corresponding arrays changing with changes in the distance between the object and said arrays, and with changes in the relative positions of said auxiliary means and said arrays,
signal processing means connected to said elements for comparing the signal from each of said elements of one of said arrays with the signal from the positionally corresponding one of said elements of the other of said arrays, and for summing the results of such comparisons to provide an output signal which has a minimum value when the radiation distributions of said detection images on the corresponding arrays are substantially identical, and
control means connected to receive and to be responsive to said output signal for effecting relative movement between at least one of said detection images and the corresponding one of said arrays, along said line of the said elements thereof, to establish a condition in which the radiation distributions of said detection images on the corresponding arrays are substantially identical and said output signal reaches the minimum value therefor, to provide a measure of the distance between the object and said arrays.

4,002,900

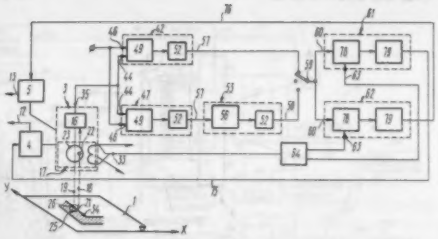
PHOTOTRACING SYSTEM

Valentin Mikhailovich Sitnichenko, ulitsa Odesskaya, 58/6, kv. 14; Alexandr Mikhailovich Zamuruev, ulitsa Tereshkovoi, 12, kv. 24, and Andrei Isakovich Kogut, ulitsa Pionerskaya, 20, kv. 12, all of Odessa, U.S.S.R.

Continuation-in-part of Ser. No. 254,467, May 18, 1972, and a continuation-in-part of Ser. No. 888,014, Dec. 24, 1969. This application May 12, 1976, Ser. No. 686,226

Int. Cl.² H01J *39/12*

U.S. Cl. 250—202 **1 Claim**



1. A phototracing system for controlling the motion of the tool of a two-coordinate machine for cutting sheet materials, comprising:

a template drawing having imaged thereon in a rectangular system of coordinates X and Y the contours of parts of arbitrary configurations, which are to be cut by said machine from a sheet material;

the contours of the parts being shown on said template drawing as a wide contrast line, one "black-to-white" edge of said wide contrast line being the outline of the contours of the parts of arbitrary configurations, to be cut from the sheet material, on said template drawing;

a tracing head having an optical axis indexed substantialy normally with respect to the plane of said template drawing;

the tracing centre of said tracing head, defined as the point of intersection by the optical axis of said tracing head of the plane of said template drawing, adapted to follow said one "black-to-white" edge of the wide line of said template drawing in a given direction; an optical tracing beam by means of which said tracing head cooperates with said template drawing;

the aperture defined by said tracing beam in the plane of said template drawing having a concentrated area of definite dimensions and determining the value of the light flux of said tracing beam;

a unit for effecting a scanning motion of said optical tracing beam of said tracing head, having a synchronizing input;

a scanning orbit defined in the plane of said template drawing, along which said aperture is adapted to be moved at a permanent speed, being a circle having for its centre said tracing centre with said tracing head being stationary;

a photoelectric transducer of said tracing head, adapted to convert the light flux of said optical tracing beam into an electric voltage at the output thereof, the value of this voltage serving as a "black" and "white" signal;

the "black" level serving as a zero point at evaluation of the voltage level at the output of said photoelectric transducer;

a signal of tracing the "black-to-white" edge of the wide line, generated at the output of said tracing head, being a cyclic alternation of said "black" and "white" levels at an angular frequency "ω" corresponding to the rotation of said aperture;

the curve representing said tracing signal having gradual increases and recesses, caused by the continuous transition of said aperture through said "black-to-white" edge from "white" to "black" and vice versa;

a first shaper of a short-duration pulse of a signal of a fixed as if instantaneous change from "white" to "black" in said tracing signal, having a first input, a second input and an output;

a second shaper of a short-duration pulse of a signal of a fixed as if instantaneous change from "black" to "white" in said tracing signal, having a first input, a second input and an output;

said first inputs, respectively, of said first and second shapers being connected with the output of said photoelectric transducer;

the fixed instant of changing from "white" to "black" being predetermined by the condition of the advance of the greater part of the area of said aperture onto "black", and the fixed instant of changing from "black" to "white" being predetermined by the condition of the advance of the smaller part of the area of said aperture upon "white";

a permanent level of voltage being preset for determining said fixed instants of the changes from "white" to "black" and vice versa by comparison thereof with the level of said tracing signal;

said permanent level of voltage being preset to be less than half of the "white" level of said tracing signal and being fed to said second respective inputs of said first and second shapers;

a comparator in each said first and second shaper, adapted to determine the algebraic sign of the difference between the compared levels of said tracing signal and said permanent preset level;

a differential circuit in each said first and second shaper, connected in series with said respective comparator to shape short-duration pulses from changes between "1" and "0" signals of said comparator, in accordance with instantaneous changes of the algebraic sign of the difference between the compared levels of said tracing signal and said permanent preset voltage level;

means for delaying each said short pulse produced by said second shaper by the time of the advance of the greater part of said aperture from "black" to "white" to the same degree as that which had initiated the production of said short pulse at the output of said first shaper at the preceding advance of said aperture from "white" upon "black";

a source of a functional cosinusoidal voltage and of a functional sinusoidal voltage, synchronous and cophasal with the angular frequency "ω" of the rotation of said aperture about said tracing centre, having two outputs, the initial phase of said sinusoidal voltage being set by the coincidence in time of the first zero levels of its sine wave with said short pulses at the output of said first shaper, under a condition that the edge of the wide line passes through said tracing centre, parallel with the X—axis of said template drawing;

a three-way switch means for three states conditionally corresponding to the three tracing modes "forward-stop-reverse";

the inputs of said first and second shapers being connected with the output of said photoelectric transducer, the output of said first shaper being connected with one "forward (reverse)" input of said three-way switch, and the output of said second shaper being serially connected through said delay means with the other "reverse (forward)" input of said three-way switch;

a first converter having a first input, a second input and an output;

a second converter similar to said first converter, having a first input, a second input and an output;

said first inputs of said first and second converters being connected with the output of said three-way shitch;

said second input of said first converter being connected to the cosinusoidal voltage output of said source of functional voltages and said second input of said second converter being connected to the sinusoidal voltage output of said source;

said first converter being adapted to convert the short pulse coming from the output of said three-way switch and the cosinusoidal voltage of said source of functional voltages into a signal representing the velocity vector of the motion of said tracing head along the X—axis, and said second converter being adapted in a similar manner to produce, with provisions for the sinusoidal voltage of said source, a similar signal with respect to the Y—axis;

the cosinusoidal and sinusoidal voltages of said source being supplied to said synchronizing input of said tracing head;

a pulse-amplitude element in each said first and second converter, having a strobing input and a functional input, the former one of said inputs forming said first input, respectively, of said first and second converters and said functional input forming said second input, respectively, of said first and second converters;

said pulse-amplitude element being adapted to produce short-duration pulses of which the amplitudes equal the instantaneous values of the voltage supplied to said functional input, in correspondence with the moments of existence of the short-duration pulses fed to said strobing input thereof;

an amplitude detector in each said first and second converter, connected with the output of the respective said pulse-amplitude element, adapted to produce at the output thereof a signal shaped as an envelope of the output signals of said element, said envelope being the signal representing the velocity vector of the motion of said tracing head along the respective coordinate axis;

a first servodrive having the input thereof connected to the output of said amplitude detector in said first converter, adapted to displace said tracing head along the X—axis of said template drawing;

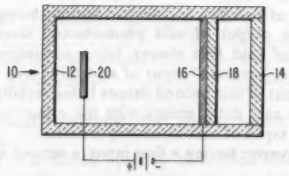
a second servodrive having the input thereof connected to the output of said amplitude detector in said second converter, adapted to displace said tracing head along the Y-axis of said template drawing.

4,002,901

PHOTODETECTOR NON-RESPONSIVE TO CERENKOV RADIATION

Jack Caryl Coffin, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,813
Int. Cl.² H01J 39/12, 31/50
U.S. Cl. 250—211 R **6 Claims**



1. A photodetector comprising:

an evacuated envelope having a face plate, said face plate selected from a transparent material which causes internal reflection of photons generated by Cerenkov radiation in the face plate;

a transmissive type photocathode spaced apart from said face plate within said envelope; and

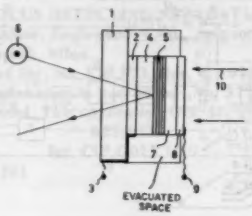
an anode within said envelope.

4,002,902

OPTICAL IMAGE CONVERTING RELAY HAVING AN ELECTRO-OPTICAL ELEMENT AND A PHOTOCONDUCTIVE ELEMENT

Jacques Donjon, Yerres; Michel Grenot, Brunoy, and Jean-Pierre Hazan, Saint-Maur, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 382,397, July 25, 1973, abandoned.
This application Jan. 7, 1975, Ser. No. 539,060
Claims priority, application France, Aug. 2, 1972, 72.27915
Int. Cl.² H01J 31/50
U.S. Cl. 250—213 R **2 Claims**



1. An optical image converting relay device of the type comprising a first source of a first radiation in the portion of the spectrum including infrared, visable and ultraviolet radiation, termed display radiation, a second source of a second light radiation, termed reading light, an optical image relay constituted by an evacuated enclosure having at least one window which is transparent to the said radiations, a photoconductive layer which is sensitive to the said first radiation aligned with said window in said relay, a plate in said relay having an electro-optical effect brought at the temperature of its Curie point and having a double refraction which is variable in accordance with an electrical potential difference existing between its faces, a first electrode which is electrically conductive and optically transparent to the said second light radiation on said plate, a second electrode on the opposite side of said plate, the improvement wherein the Curie temperature of the plate and the operating temperature of the relay are substantially that of the maximum sensitivity of the photoconductive larger in the band of the spectrum of the display light, whereby an image of an object projected on to said photoconductive larger with said second radiation is converted into phase modulated radiation in the portion of the spectrum of the first radiation, the modulation corresponding to the image.

4,002,903

SIMULTANEOUS THERMAL NEUTRON DECAY TIME AND SHALE COMPENSATED CHLORINE LOG SYSTEM

Robert W. Pitts, Jr., and Hubert D. Scott, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Mar. 7, 1975, Ser. No. 556,513
Int. Cl.² G01V 5/00
U.S. Cl. 250—267 **19 Claims**

1. A method of radioactivity well logging to investigate subsurface earth formations in the vicinity of a well borehole, comprising the steps of:

a. repetitively emitting discrete time interval bursts of high energy neutrons from a logging instrument having a pulsed neutron source and a gamma ray detection portion in the borehole during a measurement portion of an operating cycle having a measurement portion and a background portion to bombard the earth formations and produce a succession of thermal neutron populations in the borehole and formations;

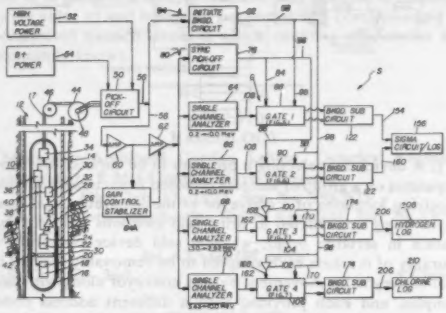
b. detecting gamma radiation in an energy range including the capture gamma ray spectrum of substantially all elements during first and second discrete detection time intervals occurring at different times after each of the

repetitive irradiation time intervals during the measurement portion of the operating cycle;

c. detecting gamma radiation in a first energy sub-range including a significant part of the capture gamma ray spectrum of hydrogen during substantially all of the measurement portion of the operating cycle;

d. detecting gamma radiation in a second energy sub-range including a significant part of the neutron capture gamma ray spectrum of chlorine which is distinct from that of hydrogen during substantially all of the measurement portion of the operating cycle;

e. deriving from the gamma radiation detected during the



first and second discrete detection time intervals occurring after each of the repetitive irradiation time intervals an indication of the macroscopic thermal neutron capture cross section of the formation;

f. simultaneously deriving from the gamma radiation detected in said first and second energy sub-ranges, a measure of the relative presence of hydrogen and chlorine in the formation; and

g. shielding the detector portion of the logging instrument with a material having the characteristic of emission of thermal neutron capture gamma radiation predominantly within said first energy subrange and substantially outside said second energy sub-range.

4,002,904

SIMULTANEOUS THERMAL NEUTRON LIFETIME AND BORON CONTENT WELL LOG

Harry D. Smith, Jr.; Ward E. Schultz, and Dan M. Arnold, all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 20, 1974, Ser. No. 534,987

Int. Cl.² G01V *5/00*

U.S. Cl. 250—270 **9 Claims**

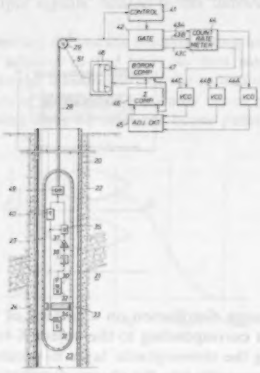
1. A method for logging earth formations traversed by a well bore comprising the steps of:

repetitively irradiating earth formations known to be substantially free of boron content with high energy neutrons and developing values of thermal neutron capture gamma ray count rates for defining the function $f(\Sigma)$ (where Σ is the macroscopic capture cross-section for thermal neutrons) for values of Σ and the thermal neutron capture gamma ray count rates;

for another section of the borehole, repetitively irradiating the earth formations over the length of such section with high energy neutrons and developing values from the thermal neutron capture gamma ray count rate of Σ and corresponding thermal neutron capture gamma ray count rates, where said gamma ray count rates include all gamma ray energies in excess of 0.8 MEV;

comparing, for discrete locations along such section the relative values of developed gamma ray count rates for selected Σ values to said function $f(\Sigma)$; and

producing indications whenever the measured values of



count rates and count rates derived from said function $f(\Sigma)$ differ as an indication of the presence of boron.

4,002,905

PENETRANT FLAW INSPECTION METHOD

Orlando G. Molina, Westminster, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 23, 1976, Ser. No. 660,594

Int. Cl.² G01N *19/08, 21/16;* **C09K** *11/06*

U.S. Cl. 250—302 **15 Claims**

1. A method for detecting cracks and flaws in the surface of an object, which comprises applying to said surface a water washable biodegradable liquid dye penetrant composition which comprises (1) a major amount of a combination of biodegradable nonionic surfactants consisting of ethoxylates of linear secondary aliphatic alcohols, with the hydroxyl groups randomly distributed, the linear aliphatic portion of said alcohols being alkyl chains containing in the range from 11 to 15 carbon atoms, one of said biodegradable surfactants containing an average of 5 moles of ethylene oxide and another of said biodegradable surfactants containing an average of 9 moles of ethylene oxide, and (2) a small amount of a dye soluble in said combination of biodegradable surfactants, removing said dye penetrant composition from said surface without removing said dye penetrant composition from said cracks and flaws in said surface, and viewing the surface of said object under lighting conditions to obtain colored traces from the dye in said cracks and flaws.

4,002,906

APPARATUS AND METHOD FOR THE RECORDING AND REPRODUCTION OF X-RAY PICTURES

Dietlind Pekau, Taufkirchen, and Eckhard Storck, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 23, 1975, Ser. No. 598,284

Claims priority, application Germany, July 31, 1974, 2436894

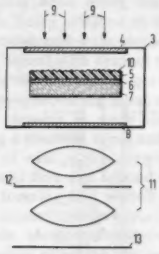
Int. Cl.² G03B *41/16*

U.S. Cl. 250—315 A **11 Claims**

1. A process for recording X-ray pictures on a thermoplastic layer mounted on a transparent layer in a housing between a transparent inlet window and a transparent outlet, the housing filled with an inert gas at a pressure of at least 10 atmospheres, comprising the steps of:

creating an electric field in the area of the thermoplastic layer between the inlet window and the transparent layer;

irradiating the thermoplastic layer through the inlet window with X-rays from an X-rayed object causing ionization of the gas and movement of ions toward the thermoplastic layer, under the influence of the electric field, to produce



a charge distribution on a surface of the thermosplastic layer corresponding to the object X-rays;

heating the thermoplastic layer to produce a surface relief corresponding to the charge distribution; and

cooling the thermoplastic layer to fix the relief.

4,002,907

ARRANGEMENT FOR TREATING SHEET-MATERIAL WEBS BY CORONA DISCHARGE

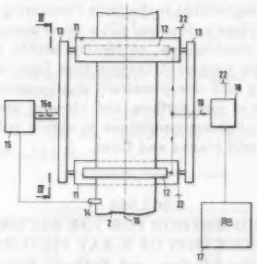
Klaus Kalwar, Alte Landwehr 10, 4803 Amshausen, Germany

Filed Oct. 15, 1975, Ser. No. 622,682

Claims priority, application Germany, Oct. 18, 1974, 2449625

Int. Cl.² H01T *19/04*

U.S. Cl. 250—325 **16 Claims**



1. In an arrangement for treating sheet-material webs by corona discharge, a combination comprising means for advancing a sheet-material web in a path; corona discharge producing means, including at least one electrode roller and at least one cooperating counter roller between which said web is compelled to pass; and edge position control means for controlling the position of the edge of said web, including portions of said electrode roller which serve as guides for the edges of said web, sensing means for sensing deviations in the position of said edge from said path, and adjusting means for adjusting the position of said electrode roller in direction transverse to said path so as to compensate for the sensed deviations.

4,002,908

PROGRAM SELECTION, PARTICULARLY FOR LIQUID SCINTILLATION SPECTROMETERS

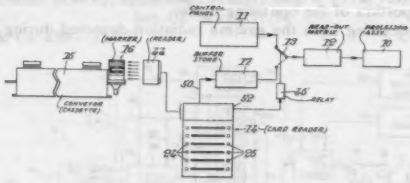
Yves Coutarel, Montrouge, France, assignor to Intertechnique S.A., Plaisir, France

Filed July 7, 1975, Ser. No. 593,563

Claims priority, application France, July 5, 1974, 74.23515

Int. Cl.² G01T *1/00*

U.S. Cl. 250—328 **8 Claims**



1. A device for selecting a program to be carried out by an apparatus on a group of samples disposed in successive sample receiving locations of a conveyor of the apparatus, said conveyor being constructed to bring said locations to a working station in seriatim order, wherein said device comprises a plurality of markers each adapted to be removably located in said conveyor for movement by said conveyor along with said samples, and each provided with a different address code; auxiliary stores in the form of cards each bearing one of said programs; read out means having a plurality of addressable card receiving locations and means for reading the card located at an addressed location; means for reading the address code of each marker as it is moved toward the working position for causing said read out means to read the card at the location having the address read by said reading means and for transferring the program read out from the card to storage means controlling the process carried out by said system.

4,002,909

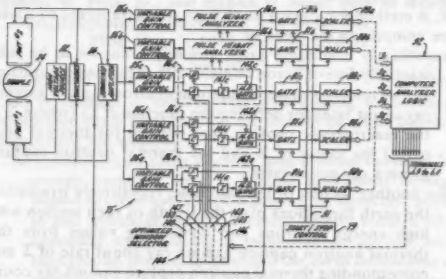
DATA ANALYZING SYSTEM HAVING PROVISION FOR OPTIMIZING COUNTING CONDITIONS AND THUS IMPROVING STATISTICAL COUNTING VALIDITY FOR ENABLING ACCURATE COMPUTATION OF SAMPLE ACTIVITY LEVELS IN LIQUID SCINTILLATION SPECTROMETRY

Lyle E. Packard, Hinsdale; Edward F. Polic, Lyle, and Robert E. Cavanaugh, Jr., La Grange Park, all of Ill., assignors to Packard Instrument Company, Inc., Downers Grove, Ill.

Filed Sept. 28, 1967, Ser. No. 674,083

Int. Cl.² G01T *7/08*

U.S. Cl. 250—328 **28 Claims**



1. Apparatus for optimizing counting conditions in test samples containing *n* radioactive isotopes disposed in a liquid scintillator with each isotope being of the type that produces an observable energy spectrum, said apparatus comprising a

light transducer, means for positioning a sample adjacent said transducer in light transmissive relationship therewith, means for measuring a selected quench indicating parameter indicative of the quench level of the sample, *n* pulse height analyzers for analyzing pulses emanating from said transducer, said *n* pulse height analyzers each including means for discriminating pulses on the basis of pulse heights, and means responsive to the value of said measured quench indicating parameter for automatically adjusting said discriminating means relative to the observed spectrum for each isotope, said adjusting means being characterized by its ability to adjust said discriminating means relative to the observed spectrum for each isotope by one of *m* predetermined, preset, amounts selected in response to the value of said measured parameter and corresponding to preselected quench levels at which counting efficiencies are accurately known.

4,002,910
RADIOLOGY

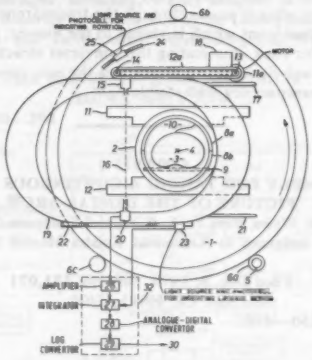
Christopher Archibald Gordon LeMay, Osterley, England, assignor to E M I Limited, Hayes, England

Filed July 17, 1975, Ser. No. 596,623

Claims priority, application United Kingdom, July 20, 1974, 32257/74

Int. Cl.² G01M *23/00*

U.S. Cl. 250—360 **5 Claims**



1. A method of constructing a representation of the distribution of absorption in a planar region of a body including the steps of providing data signals representing the absorption of the radiation along a plurality of substantially parallel paths in the plane of the said region, interpolating between the said data signals to provide further data signals representing the absorption of the radiation along an increased number of such paths and allocating, to each of a plurality of predetermined points in a field notionally delineated in the said region, the data signal or further data signal associated with the path whose centreline passes closest to that point, wherein the interpolation is achieved by forming signals representing difference of said data extending to order *m*, where *m* is at least two, subdividing some of said difference signals and combining the subdivided differences by running addition.

4,002,911
DATA ACQUISITION IN TOMOGRAPHY

Godfrey Newbold Hounsfield, Newark, England, assignor to EMI Limited, Hayes, England

Continuation of Ser. No. 471,658, May 20, 1974, abandoned. This application Aug. 27, 1975, Ser. No. 608,204

Int. Cl.² G01N *21/34*, *23/00*

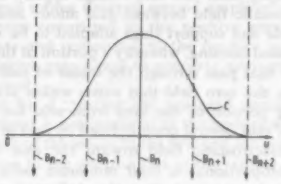
U.S. Cl. 250—360 **5 Claims**

1. Apparatus for examining a body by means of penetrating radiation such as X—or Y—radiation, comprising,

a. means for projecting the radiation through a planar section of the body,

b. means for detecting the radiation emerging from the body to provide output signals, related to the detected radiation.

c. means for scanning the means for projecting and means for detecting relative to the body so that said output signals relate to the transmission of the radiation along a plurality of sets of substantially parallel beam paths, for which the centre lines of adjacent beam paths of each



such parallel set are separated by a distance *a*, to allow the reconstruction from the output signals of an image of the variable absorption or transmission coefficient of the section, and

d. means for imposing an intensity distribution on the radiation across each of the beam paths in a direction at right angles to the beam path, said distribution being such as to limit the output signals to a spatial frequency band of which the practical upper limit is in the vicinity of or below the frequency ½*a*.

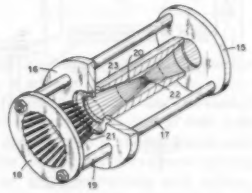
4,002,912
ELECTROSTATIC LENS TO FOCUS AN ION BEAM TO UNIFORM DENSITY

Cleland H. Johnson, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Dec. 30, 1975, Ser. No. 645,169

Int. Cl.² H01J *37/12*

U.S. Cl. 250—396 R **7 Claims**



1. An electrostatic focusing lens for focusing a point source ion beam of gaussian cross sectional distribution to a uniform cross sectional distribution at a given distance from the lens, comprising a grounded inner semi-transparent grid which is axi-symmetric with said ion beam, said grid having a minimum axial aperture that matches a central cone portion of said beam, said grid being a double conical grid including a plurality of equally spaced metallic wires with a high melting point and a low expansion coefficient and a grid ring encompassing said grid wires and defining said axial aperture and provided with a desired radius with said grid wires being threaded therethrough to thus form said double conical grid, said lens further including a first grid support ring, a second support ring, a first pair of spacer rods mounted between and to said first and second rings for providing a desired spacing therebetween, a third spring support ring, a second pair of spacer rods mounted between and to said second ring and to said third ring, and a plurality of springs equal in number to said grid

wires, said grid wires being attached at first respective ends thereof to the inner edge of said first support ring with the other respective ends of said grid wires extending through said second support ring and fastened to first respective ends of said springs and the other respective ends of said springs being affixed to the inner edge of said third spring support ring, and an insulated outer anode encompassing and spaced from said double conical grid within said desired spacing between said first and second support rings, said first, second and third support rings as well as said grid being at ground potential, said anode adapted to be connected to a voltage source, said anode shaped such that said voltage applied thereto provides an electrostatic field between said anode and said grid, said grid, anode and support rings adapted to be mounted within an evacuated housing, whereby a portion of the ions from said ion beam that pass through the inside of said grid are undeflected by the zero field that exists within said grid, and the remaining portion of the ions from said ion beam that are outside of said central cone defined by said grid are deflected by said electrostatic field toward the axis of said grid an amount proportional to their minimum radial distance from said central cone such that the deflected and undeflected portions of said ion beam merge to produce said uniform distribution at said given distance from said lens.

4,002,913

RADIOLOGY

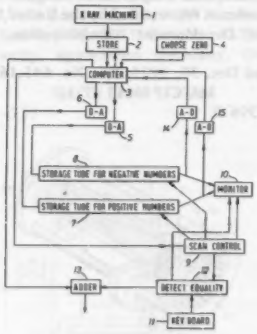
Christopher Archibald Gordon LeMay, Osterley, England, assignor to EMI Limited, Hayes, England

Filed May 8, 1975, Ser. No. 575,581

Claims priority, application United Kingdom, May 9, 1974, 20479/74

Int. Cl.² G01T *1/16*

U.S. Cl. 250—445 T **1 Claim**



1. A medical radiology diagnostic device for examining a body by penetrating X-radiation including: means for deriving, from a planar region of the body, electrical signals indicative of the absorption suffered by penetrating X-radiation traversing a plurality of sets of linear paths disposed at different positions in the plane of said planar region of the body, means for transforming said electrical signals in accordance with a convolution function to derive corresponding transformed signals, a storage tube having a target surface, means for storing on the target surface of the storage tube lines of charge each determined by the transformed electrical signal for a corresponding linear path of the X-radiation through the body and oriented on the target surface at an angle corresponding to the angle in said planar region of said corresponding linear path, a cathode ray tube having a display surface, and means for displaying on said display surface a visible brightness distribution corresponding to the charge distribution on the target surface of the storage tube.

4,002,914

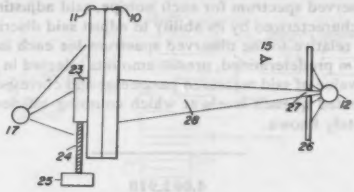
TRANSPARENCY CONTRAST ENHANCEMENT SYSTEM

Albert Macovski, Palo Alto, Calif., assignor to Maxim Diagnostic Imaging, Palo Alto, Calif.

Continuation-in-part of Ser. No. 538,017, Jan. 2, 1975, abandoned. This application Feb. 27, 1976, Ser. No. 661,959

Int. Cl.² G01N *21/38*; G02B *1/24, 5/30, 27/28*

U.S. Cl. 250—461 R **22 Claims**



1. Apparatus for viewing a transparency having a viewing side and a non-viewing side comprising:

a front illuminator for illuminating the transparency from the viewing side with a first illuminant which is substantially invisible to the viewer;

a converter structure positioned adjacent to the non-viewing side of the transparency which converts the first illuminant after it passes through the transparency to a second illuminant which is visible to the viewer; and

means for back illuminating the converter structure so that said back illumination illuminates the non-viewing side of the transparency with visible light.

4,002,915

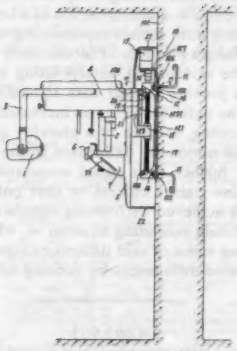
ASSEMBLY FOR TAKING A CONTINUOUS X-RAY PICTURE OF THE DENTAL ARCH

Charles M. Weiss, New York, N.Y., and Sadayasu Ota, Kyoto, Japan, assignors to Kabushiki Kaisha Morita Seisakusho, Japan

Filed Dec. 9, 1974, Ser. No. 531,071

Int. Cl.² H01J *35/00*

U.S. Cl. 250—490 **6 Claims**



1. In an apparatus for taking a continuous X-ray picture of the dental arch, comprising a support base carrying an X-ray source, a film holder, means for supporting the patient's jaw, and means for simultaneously moving the X-ray source and the film holder about the patient's jaw, the improvement

which comprises the combination of a vertically extending support base; a vertical wall construction; means for mounting said vertical support base on said vertical wall construction out of contact with the floor, said mounting means and said vertical wall construction providing the sole vertical and horizontal support for said vertical support base; means for raising and lowering said support base, comprising a housing fixed to said mounting means, a vertical threaded rod in said housing, motor means for rotating said rod, and a sleeve nut means on said support base threadely engaging said rod and operable to raise or lower the support base upon rotation of said rod; and means for preventing transverse vibrations during elevation of the support base, comprising a vertically extending U-shaped channel member on said support base and disposed around said rod, opposed vertically extending rails mounted on said housing adjacent each leg of the channel member, each rail having three roller-engaging surfaces each parallel to the longitudinal axis of the rod, the first and second surfaces being parallel to the wall construction and the third surface being perpendicular to the wall construction, a pair of rollers mounted on each leg of said channel member and engaging said first and second surfaces of the adjacent rail and a pair of rollers mounted on the base of the U-shaped channel member and engaging the third surface of the adjacent rail.

4,002,916

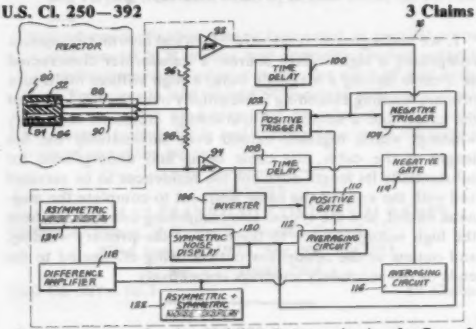
APPARATUS FOR MEASURING A FLUX OF NEUTRONS

James L. Stringer, Richland, Wash., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed June 26, 1975, Ser. No. 590,758

Int. Cl.² G01T 3/00

U.S. Cl. 250—392 **3 Claims**



1. An apparatus for determining the magnitude of a flux of neutrons at a measuring location which location is surrounded by an unwanted flux of neutrons generating noise, the system comprising:

a first conductor disposed at the measuring location and connected electrically through a first coaxial cable to a remote location;

a second conductor disposed in physical proximity to said first conductor but insulated electrically therefrom, said conductor connected by a second coaxial cable paralleling said first coaxial cable to said measuring location;

a first amplifier connected to the first coaxial cable and responsive to electrical signals therein to generate a first amplifier signal;

a second amplifier connected electrically to the second coaxial cable and responsive thereto to generate a second amplified signal;

a negative trigger connected electrically to the output of the first amplifier to generate therefrom a negative trigger signal;

a first time delay connected to the output of the first amplifier to generate therefrom a delayed first amplifier signal;

a positive trigger connected to the first time delay and responsive thereto to generate a positive trigger signal;

an inverter connected to the output of said second amplifier to generate therefrom an inverted second amplifier signal;

a positive gate connected electrically to the positive trigger and to the inverter to generate therefrom a positive gate signal upon coincidence of a positive trigger signal and an inverted second amplifier signal;

a second time delay connected to the output of the second amplifier to generate a delayed second amplifier signal;

a negative gate connected electrically to the negative trigger and to the second time delay to generate therefrom a negative gate signal upon coincidence of a negative trigger signal and a time delayed second amplifier signal;

averaging means connected to the positive gate and the negative gate and responsive to the positive gate signal and the positive gate signal to generate averaged signals therefrom; and

display means for displaying the averaged signals, which displayed signal is proportional to the statistically correlated portions of the inputs to the first and second amplifiers and hence to the neutron flux at the remote location.

4,002,917

SOURCES OF X-RADIATION

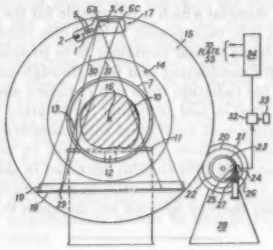
Bernard Joseph Mayo, Beaconsfield, England, assignor to EMI Limited, Hayes, England

Filed Aug. 27, 1975, Ser. No. 608,276

Claims priority, application United Kingdom, Aug. 28, 1974, 37563/74

Int. Cl.² G03B 41/16

U.S. Cl. 250—445 T **5 Claims**



1. Radiological apparatus comprising means defining a patient position, a source of X-radiation, a scanning frame supporting said source, so that the X-radiation projects through a substantially planar region of said patient position, drive means for causing said scanning frame, and with it said source, to execute an angular movement around the patient position, about an axis intersecting said region, so that the radiation projects through said region from a plurality of different directions, and detector means disposed to receive the radiation emergent from said patient position and to provide output signals indicative of the amount of radiation transmitted through said patient position along each of a plurality of paths in said region; the source comprising an X-ray emissive target which is elongated in a direction substantially parallel to said axis, a source of an electron beam, and deflecting means for deflecting said electron beam relative to said anode; means being provided for energising said deflecting means during the angular movement of said scanning frame so as to shift the region of impact of said electron beam along said anode and cause said radiation to be shifted so as to project through at least one further substantially planar region of said patient position; the detector means being adapted to accommodate the shift of said radiation and the drive means being adapted to cause said scanning frame to continue its angular movement with the electron beam in its deflected position.

4,002,918

APPARATUS FOR THE IRRADIATION OF FLUIDS

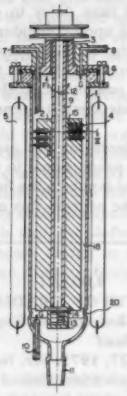
Alfred Graentzel, Durmersheimer Str. 98, 75 Karlsruhe 21, Germany

Filed Apr. 8, 1976, Ser. No. 675,142

Claims priority, application Germany, Apr. 10, 1975, 2515604

Int. Cl.² G01M 21/24

U.S. Cl. 250—431 7 Claims



1. Apparatus for the irradiation of fluids to initiate chemical reactions resulting in the formation of chemical compounds, said apparatus comprising: an axially symmetrical container consisting of a material which is permeable for the radiation to which the fluid is to be exposed; at least one radiation source so arranged relative to said container as to irradiate said container; means for conducting said fluid through said container to subject it to the radiation from said radiation source; a rotor centrally supported in said container for rotation therein; and means for rotating said rotor, said rotor consisting of a body having a plurlity of bores formed therein in an essentially radial orientation and pins slidably received in said bores and adapted, upon rotation of said rotor, to abut the inner surface of said container thereby to wipe any deposits therefrom.

4,002,919

SCANNING APPARATUS FOR MEASURING THE DIMENSION OF AN OBJECT

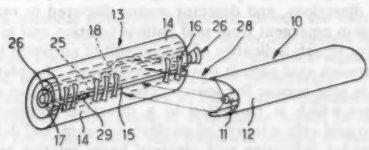
Robert Linard, 22 Bis rue de Serre, 54000 Nancy, France

Filed July 9, 1975, Ser. No. 594,234

Claims priority, application France, Nov. 4, 1974, 74.40629

Int. Cl.² G01N 21/30

U.S. Cl. 250—560 10 Claims



1. Apparatus for measuring the length of elongate products such as rolled steel shapes, comprising; an elongate light emitter for directing light onto an elongate product to produce a shadow up to an end of a length dimension of the product

light receiver means for measuring said length dimension, comprising, a cylindrical stationary element and a cylindrical rotatable element, both extending along the light emitter, one inside the other, and both having apertures for forming, by an interplay of the apertures incident to a rotation of the rotatable element, a resulting aperture which has at least a portion thereof movable along the light emitter; and

photo-electric transducer means comprising light-conducting rod means inside the elements of the light receiver means, for exposure of the rod to said shadow, through said resulting aperture, and photo-sensitive means at an end of the rod means.

4,002,920

UNDERGROUND ELECTRICAL RETICULATION SYSTEMS AND TRANSFORMERS THEREFOR

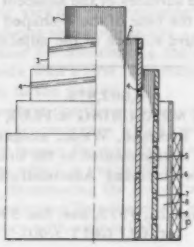
Hans Robert Jansen, 10/16 Prince St., Randwick, New South Wales 2031, Australia

Filed Dec. 20, 1974, Ser. No. 534,946

Claims priority, application Australia, Dec. 20, 1973, 6070/73

Int. Cl.² H02J 3/02

U.S. Cl. 307—17 2 Claims



1. An underground residential electrical distribution system comprising a high voltage source, a transformer constructed as a cable having a magnetic core, a high voltage multi-turn primary winding extending substantially over the full length of the cable, and a number of low voltage multiturn secondary windings which together extend over substantially the full length of the cable, the cable being laid underground for substantially its length adjacent the residences to be serviced and with the ends of the cable adjacent to complete the magnetic circuit, and the system also comprising connections from the high voltage source to the ends of the primary winding, and outlets to the residences outlets being connected to the ends of the secondary windings respectively.

4,002,921

HIGH FREQUENCY POWER SUPPLY

Frank Eugene Lowther, Severna Park, Md., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. Nos. 456,396, March 29, 1974, abandoned, and Ser. No. 509,016, Sept. 25, 1974, abandoned. This application Dec. 19, 1974, Ser. No. 534,190

Int. Cl.² H02J 1/10; H02M 7/515

U.S. Cl. 307—43 5 Claims

1. A power supply for converting high voltage DC power into high voltage AC power at frequencies of up to 10,000 Hz comprising:

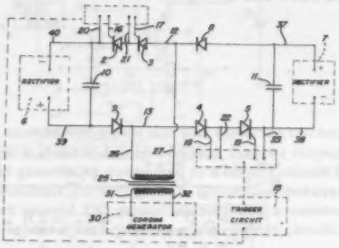
a first circuit means including a first source of DC power connected in series circuit relationship with a first diode means and first SCR means, said first SCR means including at least two series connected SCR devices;

a second circuit means including a second source of DC power connected in series circuit relationship with a second diode means and second SCR means, said second SCR means including at least two series connected SCR devices;

a power transformer having a primary and secondary winding with said primary winding connected in common across said first and second circuit means and intercon-

necting said first and second circuit means in a series circuit relationship such that the conductive polarity of the first circuit means through said primary winding is opposite to the conductive polarity of said second circuit means through said primary winding, said secondary winding being connected in series with a corona discharge type load;

trigger means connected to said first and second SCR means for alternately triggering the control gates of the SCR devices of said first SCR means and then the control gates of the SCR devices of said second SCR means at the desired high frequency;



first unequalization means connected in parallel across said first SCR means and comprising a separate predetermined impedance means for each of said series SCR devices in said first SCR means with each separate predetermined impedance means being unequal in magnitude and varying from each other by at least about ten percent; and

second unequalization means connected in parallel across said second SCR means and comprising other separate predetermined impedence means for each of said series SCR devices in said second SCR means with each of said other separate predetermined impedance means being unequal in magnitude and varying from each other by at least about ten percent.

4,002,922

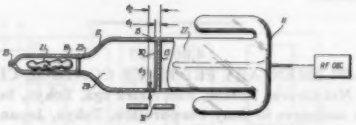
VACUUM ULTRAVIOLET CONTINUUM LAMPS

Robert A. Young, R.R. No. 2, Loretto, Canada

Filed June 12, 1975, Ser. No. 586,273

Int. Cl.² H03F 7/04

U.S. Cl. 307—88.3 **14 Claims**



1. A conversion device for converting a gas resonance photon into a photon characteristic of a gas molecule comprising in combination:

a resonance lamp filled with a first gas and providing resonance radiation at a first frequency characteristic of said first gas;

a window in said resonance lamp having a lip extending outwardly about its periphery;

a conversion cell, one wall of which is said window;

a mixture of said first gas at at least one other gas filling said conversion cell, with radiation from said lamp directed through said window into said cell forming molecules of said first gas,

which molecules decompose into atoms emitting continuum radiation at frequencies lower than said first frequency; and

a getter within said conversion cell.

4,002,923

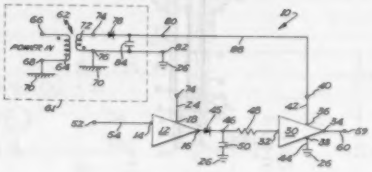
TOUCH ACTUATED ELECTRONIC SWITCH

Willis A. Larson, Mequon, Wis., and David E. Colglazier, Minneapolis, Minn., assignors to Magic Dot, Inc., Minneapolis, Minn.

Continuation of Ser. No. 284,043, Aug. 28, 1972. This application Aug. 26, 1974, Ser. No. 500,501

Int. Cl.² H01H 35/00

U.S. Cl. 307—116 **23 Claims**



1. A switching circuit actuated by the touch of a human, comprising in combination: means for supplying alternating voltage power to the switching circuit including a first output for providing a reference coupled to earth ground and including a second output for providing a source of alternating voltage; first amplification means having input means for receiving a signal to be amplified and having output means; second amplification means having input means for receiving a signal to be amplified and having output means for providing a switched output, with the switched output having a first state for approximating an electrical short circuit and a second state for approximating an electrical open circuit; storage means; a touch plate isolated from earth ground; first means for providing an electrical connection between the first amplification means and the second output of the means for supplying power to the switching circuit; second means for providing an electrical connection between the output means of the first amplification means and the storage means; third means for providing an electrical connection between the storage means and the input to the second amplification means; fourth means for providing an electrical connection between the input means of the first amplification means and the touch plate to allow the capacitance of the human to provide an earth reference to the first amplification means and cause the output of the second amplification means to change between the first and second states.

4,002,924

DEVICE FOR MEASUREMENT AND/OR CONTROL OF TEMPERATURE

Dieter K. Busch, Wollstadt, Germany, assignor to VDO Adolf Schindling AG, Frankfurt, Germany

Filed Oct. 11, 1974, Ser. No. 514,103

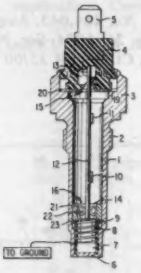
Claims priority, application Germany, Oct. 17, 1973, 2352073

Int. Cl.² H01H 35/00, 83/00

U.S. Cl. 307—117 **4 Claims**

1. A unitary temperature sensing and control device comprising, an elongated tubular metallic casing having a central longitudinal axis and an integral closure sealing its first end, a first dielectric sleeve fitting said casing and disposed contiguous to said first end, a solid state temperature sensing element fitting said first sleeve and making electrical contact with said closure, a plug closing the otherwise open second end of said casing and having an internal recess on said axis and an embedded external contact having a portion disposed in said recess, an elongated substrate body in said casing extending along said axis and having its first end adjacent said first sleeve and its second end in said recess in contact with the contact portion of said plug, an electronic integrated control circuit fixed with and extending along said substrate body from one end thereof to the other, and an electrically conductive spring in said first sleeve in contact at its respective ends with (a) said

temperature sensing element and (b) said first end of said substrate and the contiguous end of said control circuit, said spring acting to urge said element into contact with the integral closure of said casing, and said substrate into limiting axial position in said recess for making electrical connection between said element and circuit.



4,002,925

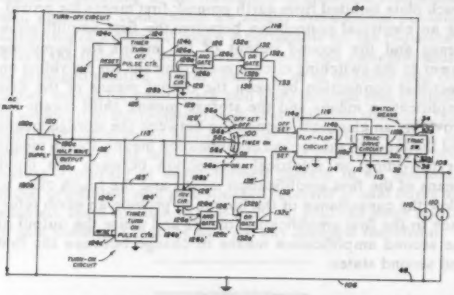
WALL-MOUNTED AUTOMATIC TIMER AND MANUAL ON-OFF LIGHT SWITCH

Brian J. Monahan, 7318 Norfolk Drive, Wichita, Kans. 67206

Filed July 3, 1975, Ser. No. 592,990

Int. Cl.² H01H 7/00

U.S. Cl. 307—141 **18 Claims**



1. A combination timer and manual on-off switch comprising: manually operable means to five different conditions, one condition being a power turn-on condition, another being a power turn-off condition, another being a timer on setting condition, another being a timer off setting condition, and another being a timer turn-on condition; a pair of power line input terminals and an outlet conductor terminal; switch means coupled between one of said power input terminals and said outlet conductor terminal for coupling and uncoupling said one power line input terminal to and from said outlet conductor terminal; and control means responsive to the different conditions of said manually operable means for closing said switch means when the manually operable means is in said turn-on condition and for opening said switch means when the manually operable means is in said turn-off condition; the control means also including timer turn-on signal generating means responsive to the particular moment when said manually operable means is moved momentarily to said timer on setting condition for generating a switch closing signal every 24 hours from the moment said manually operable means is momentarily moved to said timer on setting condition, timer turn-off signal generating means responsive to the particular moment when said manually operable means is moved momentarily to said timer off setting condition for generating a switch opening signal every 24 hours from the moment said manually operable means is momentarily moved to said timer off setting condition, and signal responsive means responsive to the generating of said switch closing and switch opening signals when said manually operable means is in said timer turn-on condition for respectively closing and opening said switch means when said signals are respectively generated.

4,002,926

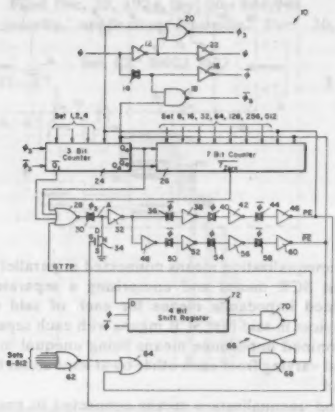
HIGH SPEED DIVIDE-BY-N CIRCUIT

Norman E. Moyer, Newport Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 2, 1975, Ser. No. 619,097

Int. Cl.² H03K 21/36

U.S. Cl. 307—225 C **10 Claims**



1. A divide-by-N circuit comprising:

an input clock;

a synchronous down-counter for providing a high speed decode of a particular counter state;

said synchronous down-counter having an output;

a ripple down-counter, which is connected to and clocked by said output of said synchronous down-counter, for providing a counter of predetermined length, which is not required to quickly decode;

a plurality of gates which provide a gated clock;

said input clock being fed into said gates; and

said gated clock being inputed into said synchronous counter.

4,002,927

COMPLEMENTARY FET PULSE CONTROL CIRCUIT

Hideo Nakamura, Komae, and Akira Iga, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 22, 1975, Ser. No. 579,813

Claims priority, application Japan, May 27, 1974, 49-59452

Int. Cl.² H03K 17/00

U.S. Cl. 307—246 **12 Claims**

1. A pulse control circuit comprising:

an input terminal supplied with a pulse signal;

a first FET put into the conductive state in response to said pulse signal;

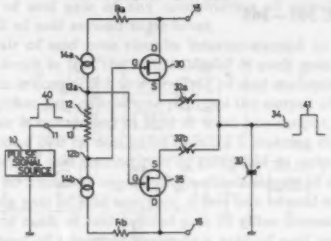
a first time constant circuit charged when said first FET is put in the conductive state;

a second FET put into the conductive state with the charging voltage of said first time constant circuit;

a second time constant circuit discharging the charged electricity in said first time constant circuit when said second FET is put in the conductive state;

an output terminal to deliver an output signal having a wave form in accordance with the time constants of said first and second time constant circuits including first and

second DC power sources of different polarity, said first and second FETs connected in series with said first and second DC power sources and said first and second time constant circuits being connected between said first and second FETs, wherein said first and second FETs have



drains, sources and gates, said sources being connected to said first and second time constant circuits respectively, and said gates being connected to a biasing circuit including a constant current circuit connected between said first and second DC power sources and a resistor connected in series with said constant current circuit.

4,002,928

PROCESS FOR TRANSMITTING SIGNALS BETWEEN TWO CHIPS WITH HIGH-SPEED COMPLEMENTARY MOS CIRCUITS

Karl Goser, Munich, and Michael Pomper, Schliersee, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

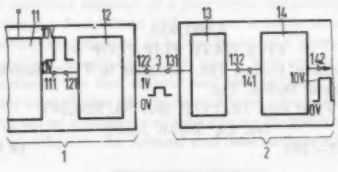
Filed Sept. 17, 1974, Ser. No. 506,840

Claims priority, application Germany, Sept. 18, 1973, 2346966

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² H03K *17/60, 19/08*

U.S. Cl. 307—251 **10 Claims**



1. A process for transmitting signals between first and second semiconductor chips each having high-speed complementary MOS circuits, comprising the steps of providing an output stage on the first chip for transforming the voltage level of a signal from a connected MOS circuit to a relatively low level voltage, providing a connection line for transmitting the relatively low level voltage to the second chip, whereby the connection line is connected with the output stage on the first chip, and providing an input stage on a second chip for amplifying the low level voltage to the original voltage level, whereby said input stage is connected with the connection line and the signal is restored to its original level for connection to a subsequent MOS circuit on the second chip.

4,002,929

A.C. TYPE TIMER CIRCUIT

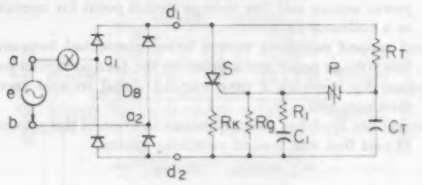
Hideo Suemasa, Hirakata; Kazuyoshi Honda, Kadoma; Katsuhiko Fukutake, Matsusaka, and Kenichi Yoda, Moriguchi, all of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed June 23, 1975, Ser. No. 589,704

Claims priority, application Japan, June 28, 1974, 49-74573

Int. Cl.² H03K *17/72*

U.S. Cl. 307—252 W **3 Claims**



1. An alternating current type timer circuit comprising a load inserted between an alternating current source and a full-wave rectifying circuit, a first series circuit of a thyristor and a first resistance inserted between output terminals of said full-wave rectifying circuit, said first resistance being connected between the cathode of said thyristor and the negative side of said output terminals of the full-wave rectifying circuit, a time-limiting circuit of a series connected time-limiting resistance and time-limiting condenser connected with the output terminals of the full-wave rectifying circuit, a pulse applying means connected with the gate of the thyristor and said time-limiting circuit, said pulse applying means being caused by the time-limiting circuit to generate pulses at a desired time after an alternating current is applied from said source, a second series circuit of a second resistance and a first condenser inserted between the gate of the thyristor and the negative side of the output terminals of the full-wave rectifying circuit, and a transistor connected at its base with the junction of said second resistance and first condenser through a third resistance and at the emitter with the junction of the first condenser and the negative side of the output terminals of the full-wave rectifying circuit, said time-limiting condenser being inserted between the collector and emitter of said transistor.

4,002,930

PHASE SWITCHING CIRCUIT

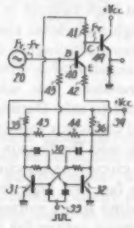
Hideki Miura, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 25, 1975, Ser. No. 571,750

Claims priority, application Japan, July 23, 1974, 49-87515

Int. Cl.² H03K *17/60, 3/286*

U.S. Cl. 307—262 **6 Claims**



1. A phase switching circuit comprising:

a bidirectional transistor having first, second and third terminals;

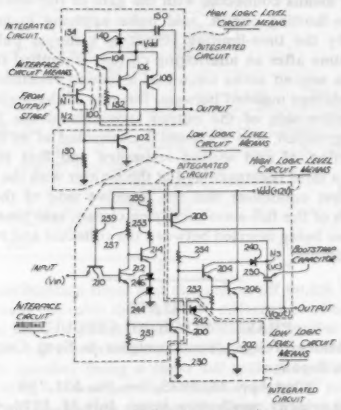
a first circuit path connected to said first terminal;
a second circuit path connected to said third terminal;
an output means connected to said first circuit path;
a power source having a relatively high voltage;
first switching means for switching the first and third terminals of said bidirectional transistor between said power source and a low voltage circuit point for operation as an emitter follower;
said first switching means being connected between a low voltage point and a point on the first circuit path;
second swiching means for switching the first and third terminals of said bidirectional transistor between said power source and low voltage circuit point for operation as a collector follower;
said second switching means being connected between a low voltage point and a point on the second circuit path;
means for applying a time varying signal to said second terminal; and
means for applying a signal means to control the sequence of said first and second switching means.

4,002,931

INTEGRATED CIRCUIT BIPOLAR BOOTSTRAP DRIVER

Frederick Tsang, Saratoga, and H. T. Chua, Cupertino, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed June 27, 1975, Ser. No. 590,922
Int. Cl.² H03K *1/14*
U.S. Cl. 307—264 **14 Claims**



1. In an integrated circuit having a single power supply, a bipolar bootstrap driver said driver comprising:

A. high logic level circuit means coupled to an output node for providing a fast, boot-strapped high logic level output voltage and fast high current in response to a first input voltage, said high logic level circuit means comprising:
1. a bipolar, biased Darlington transistor pair;
2. a bipolar transistor of a complementary type to said Darlington transistor pair, said bipolar transistor coupled in parallel to said Darlington transistor pair; and
3. a resistor and capacitor forming a series RC network in circuit across said Darlington transistor pair;

B. low logic level circuit means coupled to said output node for providing a fast low logic level output voltage in response to a second input voltage; and

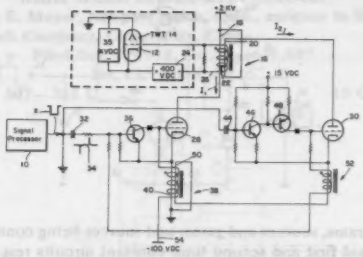
C. an interface circuit means for selectively activating said high and low logic level circuit means in response to said first and second input voltages, said interface circuit means coupled to said high and low logic level circuit means and an input node.

4,002,932

PULSE MODULATOR GATING CIRCUIT WITH TRAILING EDGE CONTROL

Harold Zaslav, Anaheim, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 2, 1975, Ser. No. 620,478
Int. Cl.² H03K *17/00*
U.S. Cl. 307—265 **10 Claims**



1. A pulse modulator for applying a pulse of energy to a load circuit during the duration of an applied control signal pulse, said pulse modulator comprising:

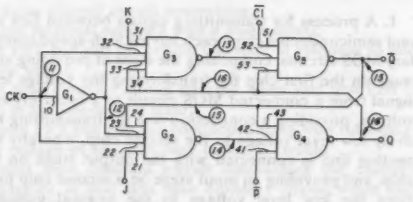
a transformer having a secondary winding adapted for being coupled across said load circuit, and first and second primary elements;
first means for applying a first current through the first primary element of said transformer during the duration of said control signal pulse;
second means for applying a second current through the second primary element of said transformer so as to produce a flux which is in opposition to the flux resulting from the current through said first primary element and such that said second current through the second primary winding commences with the trailing edge of said control signal pulse; and
wherein said first means includes a circuit arrangement having current gating means for responding to the leading edge of said control signal pulse for commencing the application of said first current, positive feedback means responsive to the said first current for increasing the value thereof, and negative feedback means responsive to said second current for terminating the flow of said first current;
whereby an output pulse is produced across the secondary winding during the duration of said control pulse signal.

4,002,933

FIVE GATE FLIP-FLOP

Horst Leuschner, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 18, 1975, Ser. No. 550,249
Int. Cl.² H03K *3/286*
U.S. Cl. 307—291 **18 Claims**



1. A flip-flop circuit comprising:

a. four multiple-input inverting gate circuits all of said gate circuits having known and essentially equal propagation

delay periods, each of said gates being operative to produce an output signal of a first logic level in response to the simultaneous application of all of said multiple inputs of said gate of signals of a second logic level and operative to produce an output signal of said second logic level in response to the simultaneous application to said multiple inputs of said gate of any combination of signals other than all of said second logic level;

b. one pair of said gate circuits interconnected to form a latch circuit in that the output signal of each gate of said one pair is connected to a first one of said multiple inputs of the other gate of said one pair and the output of one of said pair is connected to said at least one output;

c. the second pair of said gates forming a steering circuit in that each of said second pair of gates has its output connected to a second one of said multiple inputs of a corresponding gate of said one pair, a first one of said multiple inputs of each of said second pair of gates connected to the output of a noncorresponding gate of said one pair, and the second one of said multiple inputs of each of said second pair of gates being connected to receive clock signals applied to said clock signal input; and

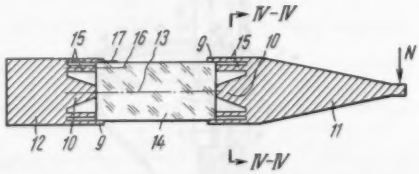
d. further comprising an interter gate having its input connected to said clock signal input and its output connected to a third one of said multiple inputs of each of said second pair of gates.

4,002,934

SENSITIVE ELEMENT OF PIEZOOPTIC MEASURING CONVERTER

Isaak Isaevich Slezinger, ulitsa Kirova 40-a, kv. 41; Georgy Mironovich Belitsky, Pervomaiskaya ulitsa, 74, kv. 101; Vladimir Alexandrovich Shiryaev, ulitsa "Iskra", 7, kv. 34, and Jury Vasilievich Mironov, Nagornay ulitsa, 68, korpus 14, kv. 34, all of Moscow, U.S.S.R.

Filed May 29, 1975, Ser. No. 581,923
Int. Cl.² H01L *41/04*
U.S. Cl. 310—8 **8 Claims**



1. A sensitive element of a piezooptic measuring converter, comprising: a foot whose end portion is made as a plurality of pins having longitudinal axes; an insert of a piezooptic material, having a longitudinal axis and a first and a second end face surfaces, the first of said end face surfaces being rigidly attached to said pins of said foot; a base whose end portion is constructed as a plurality of pins having longitudinal axes and rigidly attached to the second end face surface of said insert.

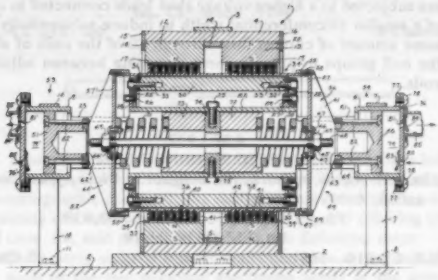
4,002,935

RECIPROCATING LINEAR MOTOR

John Robert Brauer, Milwaukee, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed May 15, 1975, Ser. No. 577,639
Int. Cl.² H02K *33/18*
U.S. Cl. 310—27 **6 Claims**

1. A linear motor, comprising permanent magnetic means including a first annular permanent magnet providing a first annular pole of a first magnetic polarity and a second annular permanent magnet providing a second annular pole of a second magnetic polarity opposed to said first polarity and axially spaced from said first pole, supporting means fixedly supporting said magnetic means and providing a magnetic circuit between said first and second magnets, coil means movably supported by said supporting means and radially spaced from said magnetic means and providing a first coil portion magnetically coupled with said first pole and a second coil portion magnetically coupled with said second pole, said coil means including a cylindrical electrical insulating member and a first plurality of spaced arc-shaped magnetically conductive members providing at least a first channel confining said first coil



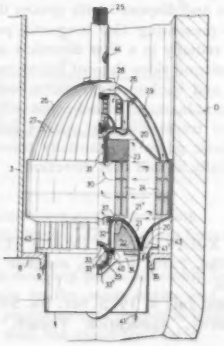
portion and a second plurality of spaced arc-shaped magnetically conductive members providing at least a second channel confining said second coil portion, input means selectively electrically connecting said coil means to an alternating current source, and output means operatively connected to said coil means and providing an oscillatory output in response to the energization of said coil means by said alternating current source.

4,002,936

ELECTRIC SUBMERSIBLE PUMP

Nikolaus Laing, Hofener Weg 35-37, 7141 Aldingen near Stuttgart, Germany

Continuation-in-part of Ser. Nos. 293,103, Sept. 28, 1972, abandoned, and Ser. No. 293,105, Sept. 28, 1972, abandoned. This application June 11, 1974, Ser. No. 478,385
Claims priority, application Austria, Oct. 7, 1971, 8658/71
Int. Cl.² H02K *17/00*
U.S. Cl. 310—166 **6 Claims**



1. An electric submersible pump having an electric motor forming a unit with a pump impeller and where said motor has a rotor connected to the pump impeller, a stator comprising a plurality of pole teeth circumferentially positioned about the axis of said stator, and a plurality of coil groups where each said group has a plurality of individual coils of varying circumferential widths symmetrically positioned within each said coil group and wherein the coils of a coil group overlie pole teeth with the coils of greater circumferential width overlying a greater number of pole teeth than coils of smaller circumfer-

ential width: the improvement comprising in that all the coils of a single coil group are electrically connected at one of their ends to a common star point, in that the common star point of all said coil groups are electrically interconnected, and in that a lead is connected to the other end of each coil of a single coil group with said lead being connectable with a single phase of a multi-phase variable voltage source such that a single phase voltage is applied to all coils of a single coil group and where the leads connected to coils of greater circumferential width are subjected to a higher voltage than leads connected to coils of a smaller circumferential width to induce substantially the same amount of current flow through all of the coils of all of the coil groups to prevent short circuiting between adjacent coils.

4,002,937

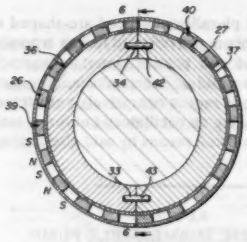
MAGNETIC SENSING DEVICE

James H. Anson, Auburn, Ill., assignor to Dickey-john Corporation, Auburn, Ill.

Filed July 3, 1975, Ser. No. 593,028

Int. Cl.² H02K *21/14*

U.S. Cl. 310—168 **7 Claims**



1. A magnetic unit for use for monitoring rotation of a rotatable member comprising annular magnetic means, mounting means supporting said magnetic means and mountable for rotation with said member to be monitored, said annular magnetic means comprising a flexible permanently magnetized material strip having an arcuate portion and a plurality of integral pole elements projecting axially from said arcuate portion and disposed with spaces therebetween, said pole elements presenting like magnetic poles at first sides thereof facing radially in a first direction and opposite magnetic poles at second sides thereof facing radially in an opposite direction, and backup magnetic means of a nonpermanently magnetizable material adjacent said second radially facing side and traversing said spaces and presenting said opposite magnetic poles substantially traversing said spaces and facing radially in said first direction.

4,002,938

X-RAY OR RAY IMAGE TUBE

Jean Pierre Pêhé, Paris, France, assignor to Thomson-CSF, Paris, France

Filed July 8, 1975, Ser. No. 593,926

Claims priority, application France, July 12, 1974, 74.24637

Int. Cl.² H01J *39/18, 39/06*

U.S. Cl. 313—101 **2 Claims**

1. An X-ray or γ ray image tube comprising an input screen receiving the incident radiation from the object, and a luminescent output screen, the two being separated by an evacuated space in which the electrons emitted in operation by said input screen under the effect of said radiation, are accelerated, their impact on said luminescent screen producing a visible image constituting the image of said object, said screen comprising a scintillator constituted by an alkaline halide, and a photocathode constituted by an alkaline antimonide, applied to either side of a barrier layer, characterised in that said barrier layer is constituted by two sub-layers applied one on top of the other, that applied to said scintillator and known as the first sub-layer, being constituted by alumina Al_2O_3 and

having a thickness ranging between 50 and 150 angstrom units, and that in contact with the photocathode, and known as the second sub-layer, being constituted by silicon sesquioxide Si_2O_3.

4,002,939

ELECTRIC LAMP

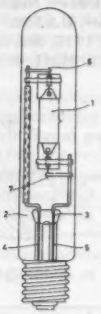
Johannes Maria Van Bragt, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 3, 1976, Ser. No. 663,487

Claims priority, application Netherlands, Apr. 1, 1975, 7503829

Int. Cl.² H01J *61/06*

U.S. Cl. 313—217 **3 Claims**



1. An electric lamp having a quartz glass lamp vessel with gas filling and pinched seal, in which seal a molybdenum foil is incorporated to which an outer current conductor and an inner current conductor are welded, characterized in that the inner current conductor, at least at the area of the welded joint at the molybdenum foil, consists of a molybdenum part which is butt welded to a part which mainly consists of tungsten and extends further in the lamp vessel.

4,002,940

ELECTRODE FOR A DISCHARGE LAMP

Tjepke Hendrik Ekkelboom, and Antonius Johannes Alberta van Stratum, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed June 6, 1975, Ser. No. 584,614

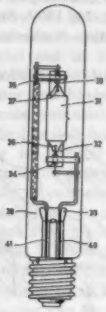
Claims priority, application Netherlands, June 12, 1974, 7407813

Int. Cl.² H01J *1/14, 19/06*

U.S. Cl. 313—346 R **15 Claims**

1. A discharge lamp which comprises: an envelope and at least two electrodes, each electrode including a head and a

supporting pin, said head being at least a semispherical fused body 20–80% by weight of tungsten, 80–20% by weight of a metal carbide chosen from the group consisting of tantalum carbide, hafnium carbide and zirconium carbide, and 0–5% of a third substance, the quantity of said third substance being



determined by weight in relation to the total weight of said tungsten and said metal carbide, said third substance being chosen from the group consisting of elementary thorium, elementary uranium, and the borides, carbides and oxides of thorium and uranium.

4,002,941

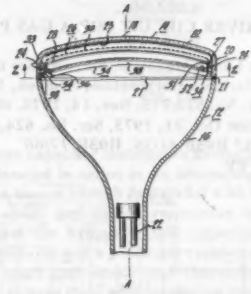
SHADOW MASK CATHODE RAY TUBE SHIELD

Robert C. Demmy, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 590,093, Oct. 27, 1966, which is a continuation of Ser. No. 374,754, June 12, 1964, abandoned. This application July 1, 1968, Ser. No. 763,996

Int. Cl.² H01J *29/07, 31/20*

U.S. Cl. 313—402 **20 Claims**



1. A cathode ray tube including an envelope panel comprising a faceplate and a peripheral side wall, a mask electrode including a multi-apertured masking portion and a peripheral reinforcing and supporting portion, said mask electrode being disposed within said panel and surrounded by said side wall with a continuous spacing gap between said side wall and said peripheral portion, means for projecting electrons toward said electrode, and an electron shield extending between said electrode and said side wall and completely blocking the passage of electrons through said spacing gap; said shield comprising a strip of metal foil and extending entirely around said gap and having a pair of flanges extending along the length thereof, one of said flanges extending along and secured to said electrode, the other flange extending along and conforming closely to said side wall, said peripheral portion of said mask electrode comprising a plurality of mounting members located within said spacing gap and supporting said electrode in said panel, said mounting members being completely shielded from said electrons by said electron shield.

4,002,942

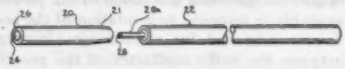
PROCESS FOR JOINING ELECTRODES AND PRODUCT RESULTING THEREFROM

Ronald F. Gaboury, 3360 Belvedere St., Brossard, Quebec, Canada

Filed July 7, 1975, Ser. No. 593,837

Int. Cl.² H05B *7/14*

U.S. Cl. 314—60 **5 Claims**



1. A process for joining two principal carbon electrodes for forming a positive electrode of an arc in the illumination of a cinematographic projector, the said principal electrodes each consisting of a core and of sleeve surrounding and adhering to said core, the said process comprising the following steps:

a. perforating an axial smooth wall blind hole at one end of each of the two principal electrodes solely in the core thereof;

b. joining the said two principal electrodes end to end by introducing a smooth surface secondary electrode into the two blind holes of the said two principal electrodes until the ends of said two principal electrodes directly contact each other, the said secondary electrode being constituted of a material similar to that of the said principal electrodes, the said secondary electrode having a diameter to tightly fit into the said blind holes to maintain a retention of the said three electrodes together.

4,002,943

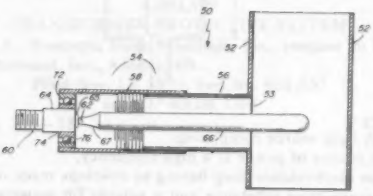
TUNABLE MICROWAVE CAVITY

Robert J. Regan, Needam, and Paul O. Haugsjaa, Acton, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed July 22, 1975, Ser. No. 598,089

Int. Cl.² H01J *7/46, 19/80*

U.S. Cl. 315—39 **7 Claims**



1. A tunable microwave cavity including

a. a main cavity having an aperture formed in the wall thereof, and

b. an adjustable coupling probe assembly for coupling microwave power to the main cavity and for accurately adjusting the penetration of the probe within the aperture of the cavity wall, the assembly having

i. a first conductive tube being rigidly affixed to the cavity wall so as to surround the aperture so that a channel is formed from the interior of the tube to the interior of the cavity,

ii. a second conductive tube in movable telescoping relationship with the first conductive tube, the conductive tubes have mutually engaging threads so that the telescoping action occurs in response to rotating the second tube with respect to the first tube, the second tube having inner dimensions which are larger than the outer dimensions of the first tube so that the second tube is disposed

over the outer end of the first tube and wherein the first and second tubes have external and internal mutually engaging threads respectively,

iii. a microwave power coupling assembly having inner and outer conductors which are fixed with respect to each other, the outer conductor being mounted within the outer end of the second tube so as to conductively contact the second tube,

iv. a coupling probe affixed to the end of the inner conductor and having a length such that the end of the probe may penetrate the main cavity in response to the telescoping effect of the conductive tubes and

v. means for inhibiting a rotation of the power coupling assembly in response to a rotation of the second conductive tube and for maintaining electrical contact between the outer conductor of the power coupling assembly and the second conductive tube, the rotation inhibiting means including a bearing assembly disposed between the outer conductor and the second tube to permit rotation of the second tube without a corresponding rotation of the power coupling assembly.

4,002,944

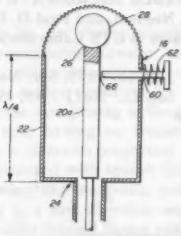
INTERNAL MATCH STARTER FOR TERMINATION FIXTURE LAMPS

William H. McNeill, Carlisle; Paul O. Haugsjaa, Acton; Joseph M. Lech, Westford, and Robert J. Regan, Newton, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Continuation-in-part of Ser. No. 570,109, April 21, 1975, Pat. No. 3,943,403. This application Nov. 17, 1975, Ser. No. 632,439

Int. Cl.² H01J *61/56*

U.S. Cl. 315—39 **3 Claims**



1. A light source comprising:

a. a source of power at a high frequency,

b. an electrodeless lamp having an envelope made of a light transmitting substance and a volatile fill material which emits light upon excitation and breakdown,

c. a termination fixture for the lamp having an inner conductor and an outer conductor disposed around the inner conductor, the conductors having a first end coupled to the source and the inner conductor having a second end coupled to the lamp, and

d. the termination fixture further having an adjustable tuning device capable of making the fixture resonant at the operating frequency so as to create an intense electric field in the fixture for starting the lamp thereby to couple more incident power into the lamp, the lamp impedance at starting being complex having a capacitive reactance component, the tuning device having tuning means for introducing a component of impedance effective to compensate for the capacitive reactance component of the lamp impedance, the tuning means further having means for introducing an inductive reactance impedance component in parallel across the inner and outer conductors substantially at the second end of the conductors.

4,002,945

PICTURE DISPLAY DEVICE HAVING A MATRIX OF DIRECT CURRENT GAS DISCHARGE CELLS

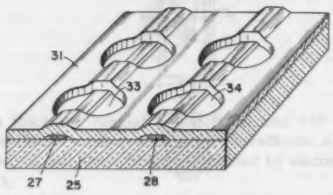
Sjouke Van Houten, and Thijs Johannes De Boer, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 243,784, April 13, 1972, abandoned. This application Sept. 24, 1973, Ser. No. 399,858

Claims priority, application Netherlands, Apr. 21, 1971, 7105349

Int. Cl.² H01J *17/34, 61/067, 61/30*

U.S. Cl. 315—58 **5 Claims**



1. A picture display device having a matrix of direct current gas discharge cells, comprising a flat panel type envelope containing an ionizable gas and including a substantially flat transparent front plate, a substantially flat rear plate parallel and sealed to the front plate, a first set of conductors on the inner surface of the front plate and a second set of conductors on the inner surface of the rear plate facing and orthogonal to the first set of conductors, and means to form the matrix of direct current gas discharge cells between the sets of conductors comprising a single insulating foil secured directly on each plate on the side facing the other plate folded over and partly covering the conductors on said plate, said foils having aligned apertures forming a matrix of holes which form the cells.

4,002,946

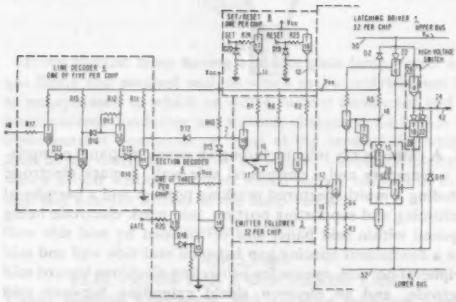
LATCHING DRIVER CIRCUIT FOR A GAS PANEL DISPLAY

Robert Chao-Chuin Liang, Manassas, Va., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 523,773, Nov. 14, 1974, abandoned. This application Oct. 21, 1975, Ser. No. 624,631

Int. Cl.² H05B *41/36;* **H03K** *17/60*

U.S. Cl. 315—169 TV **30 Claims**



1. In an electrical circuit system for supplying sustaining voltages and discharge controlling pulse voltages to one group of row conductors and one group of column conductors in a gas discharge panel device to enter and remove information on said panel, at least a pair of monolithic semiconductor bodies forming integrated circuits, one for each said group of conductors and each including a plurality of functionally identical high voltage transistor switching circuits connected by conductors in circuit configurations which comprise;

a high voltage switch having a first NPN transistor with a collector connected to the high reference potential and its emitter connected to the emitter of a first PNP transistor having its collector connected to a low reference potential;

said emitters constituting an output node connected to one of said group of conductors;

a silicon controlled switch having a second NPN transistor having its collector connected through a load to said high reference potential and its collector connected to the base of said first NPN transistor and to the base of said first PNP transistor and having its emitter connected to said lower reference potential;

said silicon controlled switch further having a second PNP transistor having its emitter connected to a current source, its base common with the collector of said second NPN transistor and its collector common with the base of said second NPN transistor;

said silicon controlled switch controlling the alternate conduction of said first NPN transistor and said first PNP transistor and latching the state of conductivity of said transistors, in response to an input control signal;

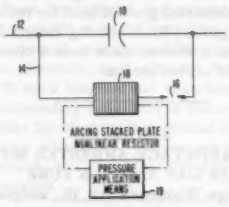
whereby said conductor can be driven to enter or remove information on said gas discharge panel.

4,002,947

ARCING STACKED PLATE NONLINEAR RESISTOR FOR VOLTAGE LIMITER APPLICATIONS SUCH AS SERIES CAPACITOR PROTECTION

Barry L. Holtzman, Bloomington, Ind., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 10, 1975, Ser. No. 585,728
Int. Cl.² H02H 7/16
U.S. Cl. 317—12 A **8 Claims**



1. A series capacitor installation having a capacitor adapted to be connected in series in an alternating current transmission line, a circuit branch in parallel with said capacitor containing a spark gap device responsive to a predetermined voltage level for bypassing said capacitor under predetermined conditions and a nonlinear resistor connected in series with said spark gap device and characterized by exhibiting increasing voltage drop with increasing current up to a predetermined voltage level at which the current can increase further at least an order of magnitude without appreciable increase in voltage drop.

4,002,948

LONG DELAY ACCELERATION MODULE FOR AN OVERLOAD RELAY SYSTEM

Wardell Gary, and Glenn R. Taylor, both of Beaver, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

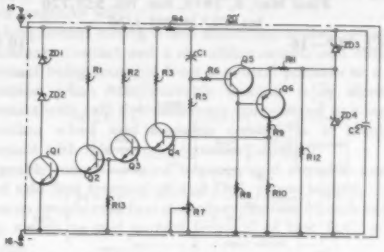
Filed June 2, 1975, Ser. No. 583,323
Int. Cl.² H02H 7/08
U.S. Cl. 317—13 A **4 Claims**

1. An electrical circuit protecting device, comprising:

sensor means for sensing circuit current in an electrical circuit and for providing an ouput voltage which is related to said circuit current, said electrical circuit being capable of providing electrical current to an electrical load which has the characteristic of drawing a relatively high value of said current when initially interconnected to said circuit, said current becoming significantly lower in value after said load has been interconnected to said circuit for a predetermined period of start-up time;

circuit interrupter trip means having separable main contacts connected in circuit relationship with said electrical circuit for interrupting electrical current therein;

inverse time overload means connected in circuit relationship with said sensor means for responding to said output voltage and for providing a trip signal to said circuit interrupter drive means, said latter signal being provided



at a time which is iversely proportional to the magnitude of said electrical circuit current after said electrical circuit current is sensed and provided said magnitude of said electrical current persists; and

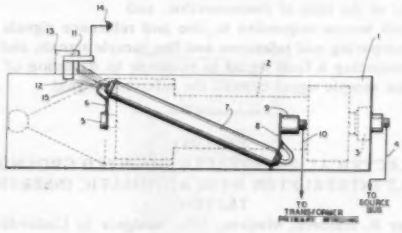
long acceleration override means connected in circuit relationship with said sensor means and said overload means, said override means comprising zener diode means for providing a fixed voltage to said overload means regardless of said high value of current flowing in said electrical circuit for a time span extending from the time said load is interconnected to said circuit until after said predetermined period of start-up time has expired, override timer means, said override time means initiating and terminating said time span by controlling said zener diode means.

4,002,949

TRANSFORMER PROTECTIVE SYSTEM

Arthur C. Westrom, Stone Mountain, Ga., assignor to Kearney-National, Inc., Atlanta, Ga.

Filed Nov. 13, 1975, Ser. No. 631,437
Int. Cl.² H02H 7/04
U.S. Cl. 317—15 **9 Claims**



1. A transformer protective system comprising a current limiting fuse and an oil expulsion fuse connected in series with each other and with a transformer primary winding, the oil expulsion fuse being of such length that it is incapable of withstanding the recovery voltage following an interrupting operation, and a grounded element having a part disposed adjacent the end of said expulsion fuse which is connected to said current limiting fuse and arranged so that an arc drawn

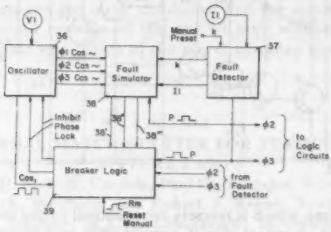
upon operation of said expulsion fuse causes the products of such arc to be directed to said grounded element thereby to cause an arc to be established between said grounded element and said current limiting fuse to cause said current limiting fuse to operate and interrupt the flow of current through said primary winding, the current limiting fuse being capable of withstanding the recovery voltage following an interrupting operation.

4,002,950

POWER TRANSMISSION CONTROL SYSTEM

Arthur F. Dickerson, Woodland Hills, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 6, 1975, Ser. No. 555,770
Int. Cl.² H02H *3/20*
U.S. Cl. 317—16 **10 Claims**



1. Power transmission control system comprising in combination:

sensing means responsive to deviations in a power transmission line and having outputs indicative of a potential fault condition in the line for producing a sample signal in an output thereof corresponding th actual power transmission;

a fault simulator comprising an oscillator and a switching device;

means connected to said switching device for actuating said switching device in response to said power line sample signal when the power line sample signal is indicative of a potential fault condition, said fault simulator producing an output which varies in time as the variation in power transmission under an actual fault condition and is in quadrature with the power line voltage;

said fault simulator further comprising a differential amplifier having input circuits connected in parallel to said varying oscillator output in the absence of a fault condition and having one of said differential amplifier inputs disconnected by said switching device from said oscillator and with said input clamped at the potential of the oscillator at the time of disconnection; and

circuit means responsive to line and reference signals for comparing said reference and line sample signals, and for producing a fault signal in response to deviation of the line sample signal beyond the reference signal.

4,002,951

ELECTRICAL RECEPTACLE MOUNTED GROUND FAULT INTERRUPTER WITH AUTOMATIC INSERTION TESTING

Werner B. Halbeck, Mequon, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Sept. 22, 1975, Ser. No. 615,698
Int. Cl.² H02H *3/26*
U.S. Cl. 317—18 D **10 Claims**

1. In an electrical receptacle apparatus for mounting in a wall outlet box or the like, the combination comprising:

socket means having terminals for receiving complementally formed prongs of an electrical connector plug;

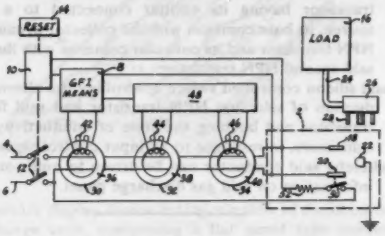
switch means for connecting terminals of said socket means to line and neutral sides of an A.C. power source and including movable contact means for completing and interrupting current between said terminals and the respective sides of said power source;

a member for releasably holding said contact means in circuit completing position;

means normally biasing said member and said contact means to move to circuit interrupting positions;

releaseable latch means normally holding said member and contact means in circuit completing positions;

electroresponsive means energizable to trip said latch means to release said member and effect circuit interrupting opening of said contact means by said biasing means;



ground fault sensing means for monitoring the flow of current through the terminals of said socket means and responsive to ground faults occuring in circuit branches connected with such terminals to energize said electroresponsive means; and

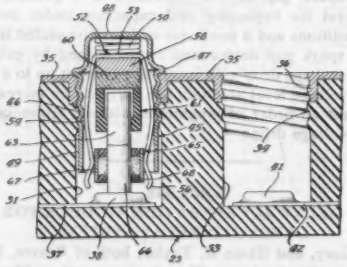
means including a member adjacent a terminal opening in said socket means and responding to a predetermined depth of insertion of a prong of a connector plug in said socket means to cause said sensing means to momentarily respond to a simulated ground fault for testing the operability of said ground fault sensing means and the other means responsive thereto each time a connector plug is inserted in said socket means.

4,002,952

ELECTRIC OVERVOLTAGE ARRESTER WITH CARBON AIR GAP AND GAS TUBE

Gysbert L. Menninga, Highland Park, Ill., assignor to CEAC of Illinois, Inc., Rosemont, Ill.

Filed Apr. 25, 1975, Ser. No. 571,580
Int. Cl.² H02H *9/06*
U.S. Cl. 317—66 **10 Claims**



1. In an electrical overvoltage arrester of the character described, in combination wih a metal housing of cylindrical shape and having a closed top and an open bottom, of a metal shorting basket within the housing disposed substantially axially thereof, a carbon air gap device and a surge voltage gas tube in an operative combination and having an aligned relation within the shorting basket, the surge voltage gas tube

discharging radially to an outer peripheral electrode and then to the shorting basket having contact therewith, whereby the conductive path for said discharges is parallel to the conductive path for discharges taking place through the carbon air gap device, both said conductive paths including the shorting basket.

4,002,953

DEVICE FOR FIXING A PRINTED CIRCUIT BOARD TO A CASKET-LIKE SUPPORT

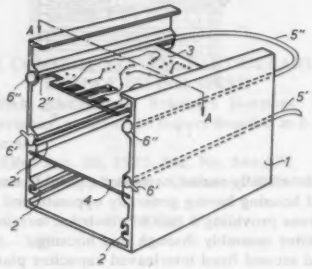
Per Tetlie, Horten, Norway, assignor to Aksjeselskapet Mikro-Elektronik, Horten, Norway

Filed May 8, 1975, Ser. No. 575,559

Claims priority, application Norway, May 15, 1974, 1771/74

Int. Cl.² H02B 1/02

U.S. Cl. 317—101 DH 3 Claims



1. A device for fixing a printed circuit board to a casket-like support equipped with a pair of parallel inside channels for guiding movement of the circuit board when it is inserted into and removed from the support, comprising at least one elongated element of elastic material extending along the channels and which in a normal, relaxed condition partly occupies the volume of the channels, said element being longitudinally stretchable with such longitudinal stretching being accompanied by a corresponding reduction in the cross section of the element, whereby the element in extended condition along the channel direction allows said movement because of its reduced cross section, and in relaxed condition fixes the circuit board to the support.

4,002,954

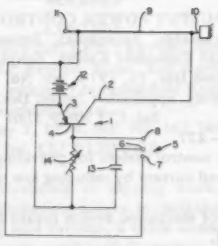
TRIGGER CIRCUIT

Carl Orlando, New Shrewsbury, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 11, 1975, Ser. No. 639,940

Int. Cl.² H02N 7/00

U.S. Cl. 318—117 9 Claims



1. A trigger circuit for heating a stretched wire to the temperature at which the wire restores to its original length, said wire having a memory such that when stretched, it remains stretched but restores to its original prestretched length when heated to the critical temperature of that wire, said wire exhibiting a contractible force toward its prestretched length when restoring to its prestretched length, said trigger circuit comprising:

a transistor having a base electrode, an emitter electrode and a collector electrode;

a length of wire having said memory and having a first end and a second end;

means to couple said collector electrode to said length of wire adjacent said first end of said length of wire;

a D.C. power supply having a first terminal and a second terminal;

means to couple said first terminal of said D.C. power supply to said emitter electrode;

means to couple said second terminal of said D.C. power supply to said length of wire adjacent said second end of said length of wire;

switching means having a first stationary contact, a second stationary contact and a movable contact, said movable contact being movable from a neutral position to a first position when said movable contact is in electrical contact with said first stationary contact and to a second position when said movable contact is in electrical contact with said second stationary contact;

chargeable means coupled between said movable contact and said first terminal of said D.C. power supply;

means to couple said first stationary contact of such switching means to said second terminal of said D.C. power supply;

means to couple said second stationary contact of said switching means to said base electrode; and

resistance means coupled between said second stationary contact of said switching means and to the common point of said chargeable means and said first terminal of said D.C. power supply, said chargeable means being charged by said D.C. power supply when said switching means is in said first position and said chargeable means when charged rendering said transistor conductive for a given period of time to transmit a current pulse through said length of wire when said switching means is in said second position.

4,002,955

HOUSING FOR ELECTRICAL, COMMUNICATIONS AND MEASURING DEVICES

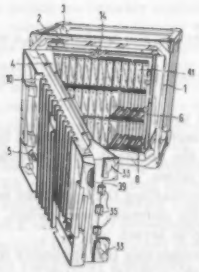
Hans-Joachim Eggert, Karlsfeld; Georg Jungnitsch, Munich; Rudi Kuehne, Munich; Walter Waliczek, Munich, and Heinrich Zenkert, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 24, 1975, Ser. No. 561,533

Claims priority, application Germany, Mar. 28, 1974, 2415051

Int. Cl.² H02B 1/04

U.S. Cl. 317—120 9 Claims



1. A housing assembly comprising: an outer housing member having one open side, a door member sealingly closing said open side and pivotally attached to a side wall of a components carrier slideably received within the housing which is removable therefrom through said open side, the door mem-

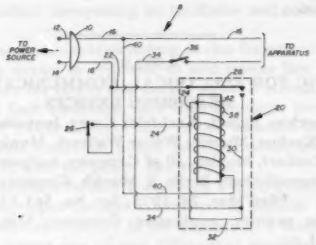
ber moveable with said components carrier with respect to said housing from a housing open side closing position when the components carrier is fully received within the housing through a door opening position when the components carrier is at an intermediate position partially removed from the housing, the door being fully openable at the intermediate position providing unobstructed access to the interior of the components carrier, a slide locking system having a portion carried by the housing interior thereof and a portion carried by the components carrier and moveable therewith, the slide locking system including means engaging both portions at said intermediate position for preventing relative movement between the components carrier and the housing locking the components carrier with respect to the housing in the intermediate position, the slide locking system being disengageable to move the components carrier to one of a fully closed position with the components carrier fully received within the housing and a fully withdrawn position with the components carrier removed from the housing, the slide locking system being disengaged in the closed and withdrawn positions.

4,002,956

AUTOMATIC ELECTRONIC LOCK OFF SYSTEM FOR AN APPLIANCE

Ross D. Minor, and Cleta M. Minor, both of 1348 E. 11th St., Tulsa, Okla. 74120

Filed June 6, 1975, Ser. No. 584,599
Int. Cl.² H01H 47/04
U.S. Cl. 317—154 **3 Claims**



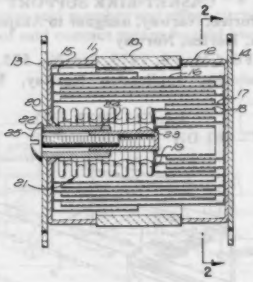
1. An automatic electronic lock off system for an appliance comprising:
an appliance,
means for connecting the appliance to a source of electrical power,
relay means including a coil and a normally open switch, and
activator switch means,
the means for connecting the appliance to a source of electrical power, the normally open switch, and the coil are connected in series,
the means for connecting the appliance to a source of electrical power, the normally open switch, and the appliance are connected in series, and
the means for connecting the appliance to a source of electrical power, the activator switch means, and the coil are connected in series,
whereby brief closure of the activator switch means activates the relay means to close the normally open switch to permit a current flow to the appliance and to permit a current flow to the coil so that the normally open switch may be held closed.

4,002,957

TRIMMABLE FIXED HERMETICALLY SEALED CAPACITOR

Marvin A. Weisbrod, Santa Clara, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed June 18, 1975, Ser. No. 587,903
Int. Cl.² H01G 5/02
U.S. Cl. 317—245 **8 Claims**



1. A hermetically sealed capacitor assembly comprising:
a sealed housing having generally opposite end walls;
first means providing a pair of electrical terminals for said capacitor assembly through said housing;
first and second fixed interleaved capacitor plate sets each electrically connected within said housing to a corresponding one of said terminals, said first and second plate sets substantially occupying the interior of said housing except for a central core volume therein extending between said opposite end walls;
trimmer capacitor means within said central core volume, said trimmer capacitor comprising a third fixed set of capacitor plates and a movable fourth set of plates interleaved therewith;
and second means including a generally elongated axially flexible wall member attached on one end to said fourth plate set and on the other end to and forming a portion of said housing end wall adjacent to the end of said central core and opposite said third set of capacitor plates, and a mechanical thrust adjustment operatively associated with said flexible wall member, said thrust member being arranged to position said fourth plate set, said thrust adjustment thereby deflecting said flexible wall member, said trimmer being thereby effectively electrically connected in parallel with the capacitor provided by said first and second plate sets.

4,002,958

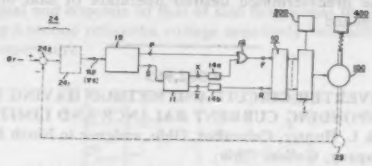
AC OUTPUT POWER CONTROL SYSTEM

Masahiko Akamatsu, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 11, 1974, Ser. No. 531,611
Claims priority, application Japan, Dec. 28, 1973, 49-4056
Int. Cl.² H02P 5/40
U.S. Cl. 318—227 **7 Claims**

1. A power control system for providing smooth transitions in effective load current by reducing low order AC harmonics, comprising;
a plurality of electronic switch means for delivering power to a load,
allocating circuit means coupled to said plurality of electronic switch means for turning said switch means on and off in a predetermined sequential order; and,
duty cycle control means coupled to said allocating circuit means for varying the duty cycle of individual switching means of said plurality of switch means in response to the phase of said load, and

said allocating circuit means together with said duty cycle control means operating to control said plurality of electronic switch means such that one of said electronic



switch means is turned on for the same variable interval during which another of said electronic switch means is turned off, whereby low order AC harmonics are reduced.

4,002,959

MOTOR CONTROL SYSTEM, PARTICULARLY TO REDUCE IDLING SPEED

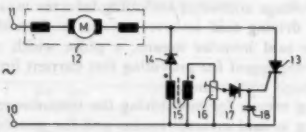
Fritz Schadlich, Stetten, and Friedrich Hornung, Stuttgart, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Jan. 28, 1975, Ser. No. 544,692

Claims priority, application Germany, Feb. 16, 1974, 2407601

Int. Cl.² H02P 7/36

U.S. Cl. 318—245 **12 Claims**



1. Electric motor control systems in which the no-load speed - torque characteristic of the motor is reduced with respect to the load - speed torque characteristic, comprising

a transformer (15) connected to sense the current flowing through the motor (12) and deriving a sensed signal;

and controlled switch means (13, 30) connected to and controlled by the measuring means (15) abruptly changing the effective voltage applied to the motor between a value corresponding to no-load speed - torque characteristic and load speed - torque characteristic in dependence on the value of the second signal when the sensed signal from the measuring means reaches a predetermined value.

4,002,960

TORQUE CONTROLLED TAPPING DEVICE

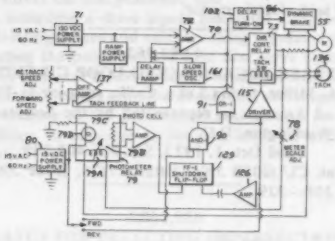
Richard A. Brookfield, Newton, Mass., and Karl R. Ritzinger, Manchester, N.H., assignors to Brookfield Engineering Laboratories, Inc., Stoughton, Mass.

Filed May 1, 1974, Ser. No. 465,748

Int. Cl.² B23Q 5/28

U.S. Cl. 318—257 **8 Claims**

1. A device for threading or tapping work, said device comprising a shaft including means to detachably secure a threading or tapping tool thereto, a drive connected to said shaft and including a reversible D.C. motor, a tachometer driven by said motor, means connected to said shaft and operable by the operator to advance or retract said shaft relative to the work, a motor circuit including an amplifier, operator controlled circuits, each operable to effect a selected direction of shaft rotation, a speed control including a feedback from the tachometer and operable to regulate the amplifier output inversely to the motor speed thereby to maintain a substantially constant, selected motor speed, at least when the shaft is turning in a thread-cutting direction, means responsive to the motor torque and including a meter presenting measurements of the torque to the operator for his guidance in the use of the operator controlled means and operable, if the torque reaches a preselected maximum, to effect the shutdown of said amplifier, at least when the motor is operated to



drive the shaft in a thread-cutting direction, and means operable to energize the motor circuit amplifier to shunt it to ground and normally maintaining said amplifier deenergized, a brake for said motor, means to operate said brake and normally maintaining said brake applied, operator controlled circuits include common means in control of said amplifier operating means and said brake operating means and operable when either is energized to effect the energization of the amplifier and the release of the brake.

4,002,961

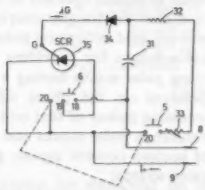
ELECTRONIC SWITCH FOR CONTROLLING THE SPEED OF A MOTOR

Ten-Hsiang Chang, P.O. Box 36-182, Taipei, China /Taiwan

Filed Sept. 5, 1975, Ser. No. 610,737

Int. Cl.² H01H 13/08

U.S. Cl. 318—305 **1 Claim**



1. An electronic switch for variably controlling the speed of an electric motor, comprising a stationary member, a trigger member, clip means for securing said trigger member slidably relative to said stationary member, a pair of electric cords extending from the inside of said trigger member for connecting said electronic switch in circuit with an electric motor and power source, switching means and a solid-state semiconductor control device supported within said trigger member; characterized in that, said switching means comprising two sets of contacts, with one set including three electrically conductive contacts, another set including one electrically conductive contact and a resistor for providing various resistance values, disposed on said trigger member in spaced relation to each other, and two electrically conductive bridging contacts mounted on said stationary member in isolated relation to each other for contacting with respective set of contacts; while said trigger being manually actuated with respect to said stationary member, the first bridging contact is movable among a non-bridging position wherein said first bridging contact engages with the first contact of the said three contacts, a first

bridging position where said first bridging contact engages with the first and the second contacts of the said three contacts, and a second bridging position wherein said first bridging contact engages with the first and the third contacts of the said three contacts; simultaneously, the second bridging contact is movable with one end thereof slidably engaging with the contact of associated set and the other end thereof slidably engaging with said resistor for providing various resistance values in a manner to control the application of variable magnitude of electrical energy, for selectively varying the speed of said electric motor.

4,002,962

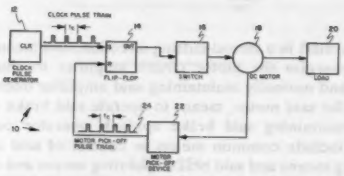
PHASE LOCKED SERVO LOOP CIRCUIT

Samuel A. Miller, China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 1, 1973, Ser. No. 402,220

Int. Cl.² G05B *5/00*; H02K *27/70*; H02P *5/08*

U.S. Cl. 318—329 **4 Claims**



1. A phase locked servo control system loop for changing the speed of a direct current motor operating under varying load conditions to maintain a constant predetermined motor speed comprising:

reference pulse means for providing a first control signal of a series of successive pulses having a substantially fixed repetition rate in accordance with a predetermined desired operation of said motor;

speed responsive means operatively connected to sense the speed of said motor for providing a second control signal output of successive electrical pulses having a repetition rate proportional to actual rotation of said motor;

pulse responsive means electrically coupled to receive successive pulses from said reference pulse means and said speed responsive means for providing a train of output pulses of varying pulse width having a pulse width time duration dependent on the phase difference between individual successive pulses of first control signals generated by said reference pulse means and individual successive pulses of second control signals generated by said speed responsive source;

detector means operatively coupled to said pulse responsive means and to gating control means for supplying a pulsed output control signal whenever the time interval between each second control signal pulse is less than the time interval between each first control signal pulse;

coincidence means having inputs electrically coupled to receive output signals from said pulse responsive means and said detector means for producing an output in response to identical output signals;

overspeed responsive means coupled to receive signals from said coincidence means and said speed responsive means for supplying output pulse signals in response to said motor overspeed;

control logic circuit means coupled to accept output pulse signals from said overspeed responsive means for preventing said reference pulse means first control signals from being received by said pulse responsive means; and

switching means operatively connected to receive an electrical output from said pulse responsive means for supplying current to said motor in response to the time duration of the pulses for maintaining the rotation of the motor at its predetermined desired operation.

thereby causing the switching means from supplying current to the motor until such time as the motor speed decreases to cause said second control signal pulse to occur at the same time as said first control signal pulse at which time the predetermined desired operation of said motor is reached.

4,002,963

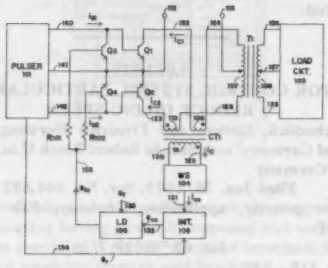
CONVERTER CIRCUIT AND METHOD HAVING FAST RESPONDING CURRENT BALANCE AND LIMITING

Patrick L. Hunter, Columbus, Ohio, assignor to North Electric Company, Galion, Ohio

Filed May 29, 1975, Ser. No. 581,915

Int. Cl.² H02M *1/08*

U.S. Cl. 321—18 **7 Claims**



1. In a voltage converter including inverter means, pulsing means for driving said inverter means, and an output load coupled to said inverter means, a pulse width modulation control arrangement for providing fast current limit and balance functions comprising;

a. sensing means for monitoring the instantaneous current flowing in said inverter means and for generating a first signal directly proportional to said instantaneous current;

b. waveshaping means, exhibiting a nonlinear, monotonically increasing transfer characteristic, responsive to said first signal to produce a second signal related to said first signal by said characteristic;

c. integrator means, connected to said waveshaping means and to said pulsing means, operative in response to said second signal to generate a feedback signal during each half cycle of operation of said inverter means, and operative in response to a reset signal from said pulsing means to reset said feedback signal to a predetermined reset level at the end of each half cycle of operation of said inverter means;

d. level detection means responsive to said feedback signal and operative with respect to a predetermined reference level to generate a control signal whenever said feedback signal exceeds said predetermined reference level; and

e. control means, responsive to said control signal, operative to terminate the flow of said instantaneous current for the remainder of the instant half cycle of operation of said inverter means thereby providing, within said instant half cycle of operation, inverter current balancing and limiting.

4,002,964

TEMPERATURE COMPENSATION TECHNIQUE

Bernard M. Gordon, Magnolia, Mass., assignor to Gordon Engineering Company, Wakefield, Mass.

Filed Oct. 2, 1975, Ser. No. 618,784

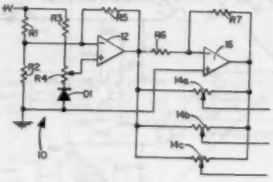
Int. Cl.² G12B *7/00*

U.S. Cl. 323—16 **9 Claims**

1. For use in apparatus in which electrical response is a function of temperature, a temperature compensation system comprising:

first means having a positive temperature characteristic for providing a first reference voltage positively increasing with temperature;

second means having a negative temperature characteristic equal and opposite to that of said first means for providing a second reference voltage negatively increasing with temperature;



said first and second reference voltages having a null value at a predetermined reference temperature; and

means for deriving at least one correction voltage from both said first and second reference voltages of a magnitude and sense to correct for particular temperature error.

4,002,965

SYNCHRONIZED AND REGULATED POWER SUPPLY

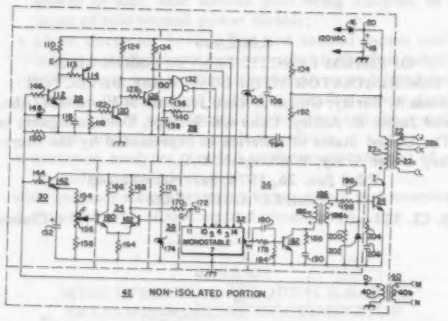
Willem den Hollander, Schlieren, Switzerland, assignor to RCA Corporation, New York, N.Y.

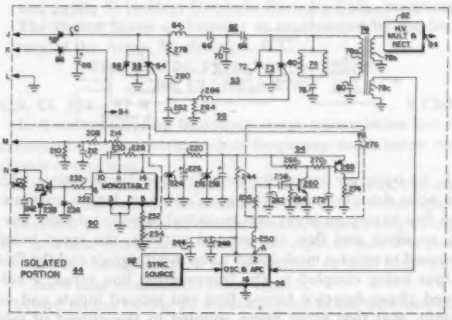
Filed Aug. 25, 1975, Ser. No. 607,512

Claims priority, application United Kingdom, June 10, 1975, 24861/75

Int. Cl.² H04N 3/18

U.S. Cl. 323—17 **9 Claims**





1. A synchronized and regulated power supply comprising;

switching regulator means adapted to be coupled to a source of alternating current potential for producing a direct current potential having an amplitude proportional to the duration of a first drive signal condition relative to the duration of a second drive signal condition;

oscillating means adapted to be coupled to a source of synchronizing signals for producing a switching signal having a first predetermined phase offset relationship with respect to said synchronizing signals;

modulating means coupled to said switching regulator means and said oscillating means for producing a control signal having a second predetermined phase offset relationship with respect to said switching signal and having an amplitude which is proportional to the amplitude of said direct current potential; and

means including a drive signal generator coupled to said modulating means and said switching regulator means for initiating the production of said first drive signal condition in response to the initiation of said control signal and for controlling the duration of said first drive signal condition relative to the duration of said second drive signal condition in response to the amplitude of said control signal.

4,002,966

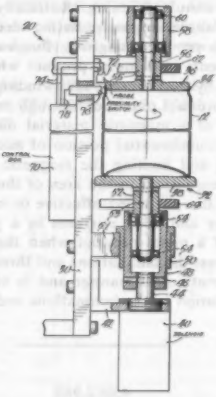
APPARATUS FOR DETECTING IMPERFECTIONS ON THE WALL OF CYLINDRICAL CONTAINERS

James J. Hinds, LaGrange, and Lawrence D. Stepenske, Darlen, both of Ill., assignors to National Can Corporation, Chicago, Ill.

Filed Feb. 21, 1975, Ser. No. 551,976

Int. Cl.² G01R 33/12

U.S. Cl. 324—37 **11 Claims**

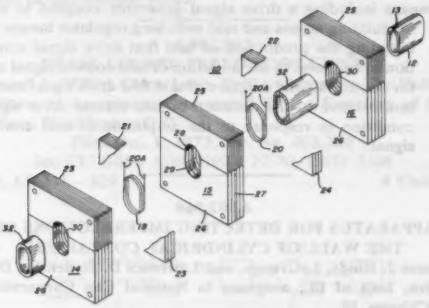


1. Testing apparatus for detecting an imperfection in a peripheral flange of a cylindrical metal container body comprising: a hub supported for rotation about a vertical axis with said hub having a plurality of like testing stations at circumferentially spaced locations, each testing station being a removable unit including a support secured to said hub; fixed inductor means secured to said support and generating a magnetic field in response to a flow of current in said inductor means having a substantially constant rms value, holding means on each support and engaging upper and lower ends of a container body in a testing station for holding said container body in a position where said peripheral flange intersects said magnetic field generated by said inductor means, receiving means operatively connected to said inductor means for detecting variations in said rms value, switch means on each station cooperating with said holding means and connected to said receiving means for energizing said receiving means when a container body is present in said holding means in a test position; and a stationary belt means extending around the periphery of said hub and cooperating with said holding means for simultaneously rotating a plurality container bodies in respective test stations so that all portions of said flanges intersect said magnetic fields.

4,002,967
ANNULAR EDDY CURRENT TEST COIL WITH MAGNETIC LAMINATIONS ADJACENT A LIMITED CIRCUMFERENTIAL EXTENT

S. Reed Fennell, Kittanning, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Aug. 1, 1975, Ser. No. 601,203
Int. Cl.² G01R 33/12
U.S. Cl. 324—40 7 Claims



1. A magnetic pole and coil assembly for limiting and concentrating eddy currents in a peripheral arc portion of a metal product, the assembly comprising

at least one annular winding electrically connectable to a source of alternating or pulsating electrical energy, and adapted to produce magnetic flux capable of inducing eddy currents in a metal product when the winding is energized by said source, said winding being adapted to have the product pass therethrough and

laminations of a magnetic material disposed adjacent a limited circumferential portion of said winding for concentrating and limiting the magnetic flux produced by said winding in and to the area of the magnetic laminations, and thereby being effective to increase the density of the flux and eddy currents in a predetermined arc portion of a metal product when the metal product is directed past the laminations and through the winding in a rapid, continuous manner and in close proximity but spaced relation to the laminations and winding.

4,002,968
GROUND FAULT DETECTOR FOR A TWO-WIRE POWER SUPPLY

Ian Reid, Waterloo, Canada, assignor to General Signal Corporation, Rochester, N.Y.

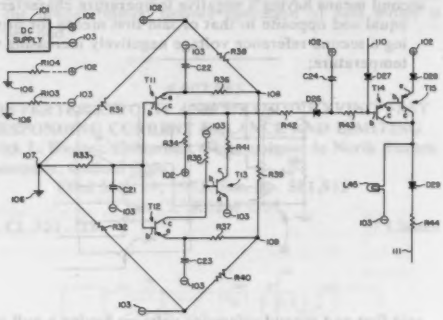
Filed June 10, 1975, Ser. No. 585,547
Int. Cl.² G01R 31/02
U.S. Cl. 324—51 9 Claims

1. Circuit means for responding to a ground fault on the first or second lead of a two wire d.c. power supply and comprising in combination:

a. a first voltage divider having first and second fixed resistive elements coupled in series and bridged between said first and second leads of said d.c. power supply and with the junction of said first and second fixed resistive elements coupled to ground;

b. a second voltage divider having third, fourth and fifth resistive elements coupled in series and bridged between said first and second leads and with the junction of said third and fourth resistive elements and said fourth and fifth resistive elements forming first and second junction points, respectively; and

c. first and second potential comparators coupled between said ground and said first and second junction, respectively, for responding to the occurrence of a potential difference, exceeding a predetermined threshold value, between said ground and said first or second junction,

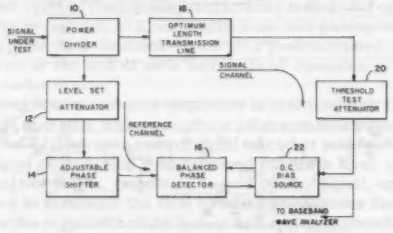


respectively, when a ground fault appears on said first or second lead, respectively, of said d.c. power supply.

4,002,969
OPTIMUM LENGTH TRANSMISSION LINE DISCRIMINATOR WITH LOW NOISE DETECTOR

Thomas A. Barley; Gustaf J. Rast, Jr., both of Huntsville, Ala., and James R. Ashley, Colorado Springs, Colo., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 26, 1976, Ser. No. 652,445
Int. Cl.² G01R 27/00
U.S. Cl. 324—57 N 6 Claims

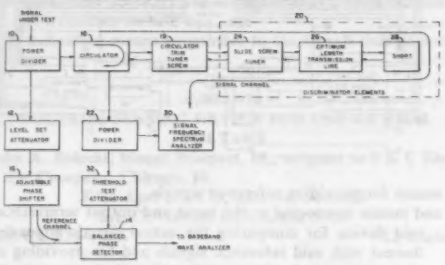


1. An optimum length transmission line discriminator with low noise detection, comprising: an optimum length transmission line having an input and an output; a power divider having an input and first and second outputs, the input being disposed to receive modulation noise input signals and the first output being coupled to the transmission line input; a balanced phase detector having first and second inputs and an output, said first input being coupled to the output of said transmission line, said second input being coupled to the second output of said power divider, and said output being disposed for supplying output measurement signals therefrom; and a direct current bias source coupled to said phase detector for enhancing amplitude modulation rejection ratios of said discriminator.

4,002,970
OPTIMUM THRESHOLD TRANSMISSION LINE DISCRIMINATOR

James R. Ashley, Colorado Springs, Colo.; Gustaf J. Rast, Jr., and Thomas A. Barley, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 26, 1976, Ser. No. 652,593
Int. Cl.² G01R 27/00
U.S. Cl. 324—57 N 10 Claims



1. An optimum threshold transmission line discriminator circuit for measuring characteristics and frequency modulation noise on input signals comprising:

first and second power divider means, each having an input and first and second outputs, the input of said first power divider being disposed to receive said modulation noise signals;

signal circulator means having first, second, and third ports, said first port being coupled to the first output of said first power divider, said second port being coupled to the input of said second power divider;

a phase dectector having first and second inputs and an output, said first input being coupled to the first output of said second power divider and said second input being coupled to the second output of said first power divider, the output of said detector being disposed for coupling output measurement signals therefrom;

a spectrum analyzer coupled to the second output of said second power divider; and

discriminator means having an input-output port coupled to the third port of said second circulator.

4,002,971
WIDE OPERATING FREQUENCY RANGE TRANSMISSION LINE DISCRIMINATOR

Gustaf J. Rast, Jr.; Thomas A. Barley, both of Huntsville, Ala., and James R. Ashley, Colorado Springs, Colo., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 26, 1976, Ser. No. 652,446
Int. Cl.² G01R 27/00
U.S. Cl. 324—57 N 9 Claims

1. A wide operating frequency range transmission line discriminator for measuring input frequency modulation noise signals comprising:

a bandpass filter having an input and an output, the input being disposed to receive said modulation noise signals;

first and second power divider means, each having an input and first and second outputs, the input of said first power divider being coupled to the output of said filter to receive said modulation noise signals;

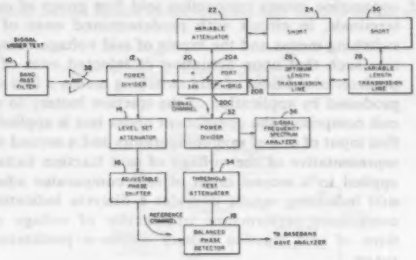
hybird means having an input coupled to the first output of said first divider and having first, second, and third ports;

a variable attenuator and transmission line short circuit coupled in series to said first hybrid port for attenuating signals coupled thereto and directing said signals back to said hybrid;

an optimum length transmission line and a transmission line short circuit coupled in series, with said optimum length line being coupled to said second port of said hybrid;

said third hybrid port being coupled to the input of said second power divider;

quadrature detection means having first and second inputs and an output, said first input being coupled to the first



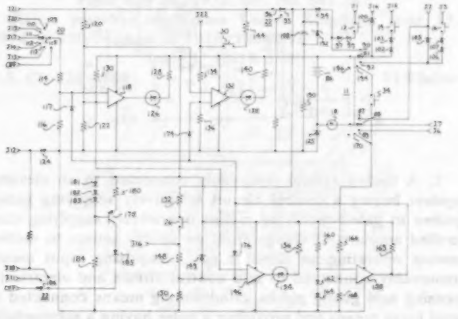
output of said second power divider and said input being coupled to the second output of said first power divider, the output of said detection means being disposed for coupling output measurement signals therefrom; and

a spectrum analyzer coupled to the second output of said second power divider.

4,002,972
ELECTRIC VEHICLE CONTROL ANALYZER

Charles Edward Konrad, and Lynnie Barry Brown, both of Roanoke, Va., assignors to General Electric Company, New York, N.Y.

Filed Mar. 18, 1975, Ser. No. 559,496
Int. Cl.² G01R 15/12, 31/02
U.S. Cl. 324—73 R 11 Claims



1. Test apparatus adapted for connection to an electric vehicle propulsion control system of the type wherein a power control system comprising plural types of electrical components supplies regulated electric power from a traction battery to electric traction motor means, and a logic circuit is normally connected to control the operation of the power control system, said test apparatus being adapted for connection to said propulsion control system in lieu of said logic circuit for testing individual components of said power control system in situs, and comprising:

a. a plurality of output terminals adapted for simultaneous connection to said propulsion control system;

b. plural switching means adapted to be selectively actuated, in accordance to the individual one of said components to be tested;

c. a plurality of indicating means adapted to provide a discrete indication of performance of components being tested;

d. a piurality of voltage comparators, each comprising first and second inputs and an output coupled to at least one of said indicating means;

e. a first group of said output terminals being adapted for connection in circuit with said traction battery and with predetermined ones of the components of said propulsion control circuit; and

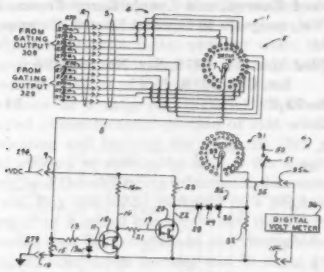
f. connection means connecting said first group of output terminals, in circuit with predetermined ones of said switching means and the inputs of said voltage comparators such that upon actuation of selected ones of said predetermined ones of said switching means a first signal produced by application of the traction battery to a circuit comprising the component under test is applied to a first input of one of said comparators and a second signal representative of the voltage of said traction battery is applied to a second input of said comparator whereby said indicating means provides a discrete indication of component performance irrespective of voltage variations of said traction battery within a predetermined range.

4,002,973

ELEVATOR TESTING SYSTEM

Theodore O. Wiesendanger, Wauwatosa, and John V. Seals, Brookfield, both of Wis., assignors to Armor Elevator Company, Louisville, Ky.

Filed Dec. 23, 1975, Ser. No. 643,684
Int. Cl.² G01R *15/12*; B66B *1/00*
U.S. Cl. 324—73 R **31 Claims**



1. A testing system removably connected to an elevator system having a control circuit selectively supplying gating pulses to gated rectifying means operatively supplying controlled amounts of energy from an energy source to motive means operating an elevator car, comprising input means removably connected to said control circuit and electrically sensing said gating pulses, conditioning means connected to said input means and providing a pulse having a substantially uniform magnitude in response to each of said sensed gating pulses, and means connected to said conditioning means and providing an output representing the substantial average of said uniform pulses over a predetermined period of time.

4,002,974

METHOD AND APPARATUS FOR TESTING CIRCUITS

Edward Wherry Thomas, Hanover Township, Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

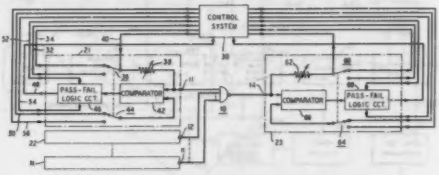
Filed Nov. 13, 1975, Ser. No. 631,731
Int. Cl.² G01R *15/12*
U.S. Cl. 324—73 R **7 Claims**

1. Apparatus for testing an electrical device having multiple input and output terminals, the intended functional operation of said device being represented by a logical truth table or function table, said testing being intended to assure that the prescribed functional capabilities of the device as well as specified parameters of the device conform to design standards, said apparatus comprising

plural variable loads respectively connected to the input and output terminals of said device,

means for setting said loads to values corresponding to device parameters to be tested,

means for applying successive sets of fixed input and output signals to said device via said respective variable loads in accordance with said table,



means for providing reference signals,

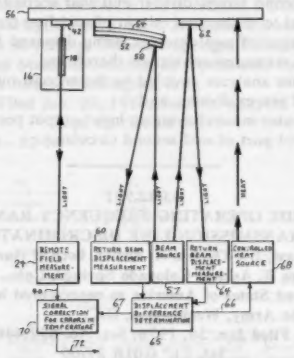
and means connected to the input and output terminals of said device for comparing the actual signals appearing thereat with said reference signals and for providing an error indication in the event that the relative magnitudes of any corresponding pair of actual and reference signals deviates from a prescribed relationship.

4,002,975

ELECTRO-OPTIC MEASUREMENT OF VOLTAGE ON HIGH-VOLTAGE POWER LINES

Dennis C. Erickson, Beaverton, and Gail A. Massey, Cornelius, both of Oreg., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Feb. 26, 1976, Ser. No. 661,465
Int. Cl.² G01R *31/00*
U.S. Cl. 324—96 **10 Claims**



1. In a system for measuring a field in the vicinity of a high-voltage power transmission line comprising:

A. a field-sensitive optical element located in the field,

B. light-source means for directing a polarized beam of coherent light through the optical element, and

C. direction-measurement means for measuring the direction of polarization of the beam which emerges from the optical element to derive a signal indicative of field strength,

the improvement comprising:

D. temperature-measurement means for measuring the temperature of the optical element in comparison with a predetermined temperature level to derive an error signal, and

E. correction means responsive to the error signal for eliminating errors in the field-strength signal.

10. A system for measuring transients in the field of a high-voltage power transmission line caused by faults in the line comprising:

A. a field-sensitive optical element located in the field,

B. light-source means for directing a polarized beam of coherent light through the optical element,

C. means for measuring the direction of polarization of the beam which emerges from the optical element of derive a signal indicative of field strength,

D. filter means for passing components of said signal no lower than 250 KHz and no higher than 2 MHz indicative of transients on said line, and

E. indication means responsive to the signals thus passed.

4,002,976

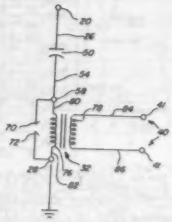
VOLTAGE SENSING DEVICE FOR USE AT HIGH VOLTAGE

John A. Zulaski, Mount Prospect, Ill., assignor to S & C Electric Company, Chicago, Ill.

Filed Apr. 1, 1975, Ser. No. 564,109

Int. Cl.² G01R 1/20; G05F 5/00

U.S. Cl. 324—126 **22 Claims**



1. A voltage sensing device for providing a signal representative of the voltage between the high voltate side of a circuit and ground comprising:

a capacitor electrically connected at a first side to the high voltage side of the circuit;

a transformer having primary and secondary windings, said primary winding being serially connected between the second side of said capacitor and ground so that all of the current flowing through said capacitor also flows through said primary winding;

output terminals connected across said secondary winding;

an insulator body means formed of an electrically insulating material surrounding said capacitor and said transformer for providing line to ground insulation between the high voltage side of the circuit and ground;

whereby the signal representative of the voltage on the high voltage side of the circuit can be derived at said output terminals as well as electrical power for low-burden auxiliary apparatus.

4,002,977

MEASURING CIRCUIT

Shan C. Sun, Pittsburgh, Pa., and Anthony G. Chaprnka, Cockeysville, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 24, 1975, Ser. No. 598,609

Int. Cl.² G01R 15/10; G06G 7/12

U.S. Cl. 324—132 **10 Claims**

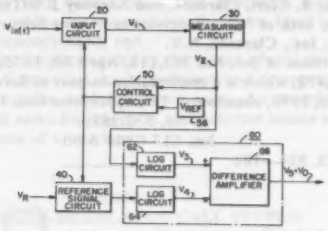
1. The combination of:

a signal measuring circuit means having an input and a output, and a defined dynamic range;

an input circuit means connected to said input of said signal measuring circuit means to adjust the magnitude of an input signal in response to a control signal to a level within said defined dynamic range and supply the resulting adjusted signal to said signal measuring circuit means, said signal measuring circuit means producing a first output signal corresponding to a predetermined characteristic of the adjusted signal;

a reference signal circuit means for adjusting the magnitude of a predetermined reference signal in response to said control signal and developing a second output signal indicative thereof;

control circuit means for developing said control signal; and



an output circuit means, including a log-ratio circuit means, for restoring the magnitude of said first output signal to a level corresponding to said input signal and restoring the magnitude of said second output signal to the level of said predetermined reference signal and producing a third output signal which is the log-ratio of the restored first and second output signals.

4,002,978

MOVING-COIL ELECTRICAL INSTRUMENTS WITH RADIALLY SPACED ANNULAR AIR-GAPS

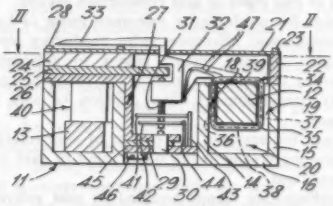
Percy Edwin Towndrow, Harrow, and James Bernard Vousden, St. Albans, both of England, assignors to Smiths Industries Limited, London, England

Filed May 27, 1975, Ser. No. 581,247

Claims priority, application United Kingdom, June 13, 1974, 26330/74; Apr. 3, 1975, 13680/75

Int. Cl.² G01R 5/08

U.S. Cl. 324—150 **11 Claims**



1. A moving-coil electrical instrument comprising an electric coil having first and second portions, means mounting the electric coil for angular displacement about an axis, a magnetic circuit assembly comprising a housing of magnetic material having inner and outer radially-spaced, substantially annular surfaces, an annular core member of magnetic material, and means mounting the core member between the said inner and outer housing surfaces to define, between the said inner housing surface and the core member, and between the said outer housing surface and the core member, respective inner and outer radially-spaced annular air-gaps, the coil mounting means being so arranged that the coil embraces the core member with its said first and second portions extending through respective ones of the air-gaps to cause electromagnetically-induced torque to be applied to the coil about the said axis, and the nominal dimensions of said radially-spaced annular air-gaps being unequal and so related to one another that, at any angular position of the coil, a change in the com-

ponent of the said torque induced into the said first portion of the coil, arising from radial displacement of the core member, is compensated by change of opposite sense and substantially equal magnitude of the said torque induced into the said second portion of the coil.

4,002,979

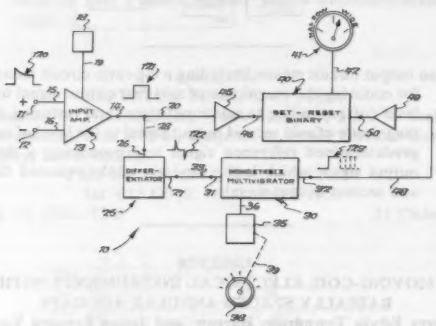
PULSE COMPARATOR

Francis A. Giori, Clarence, and Anthony J. DiTusa, Williamsville, both of N.Y., assignors to Electro Sciences for Medicine, Inc., Clarence, N.Y.

Division of Ser. No. 353,118, April 20, 1973, Pat. No. 3,854,472, which is a continuation-in-part of Ser. No. 84,646, Oct. 28, 1970, abandoned. This application Dec. 12, 1974, Ser. No. 532,257

Int. Cl.² G04F 8/00

U.S. Cl. 324—181 **7 Claims**



1. Electrical pulse width measuring aparatus comprising:

a. comparison means having first and second inputs and responsive to input pulse time duration for providing an indication of relative pulse width, said comparison means including means for maintaining said indication until another pulse arrives;

b. means for applying an input pulse of unknown time duration to one input of said comparison means;

c. means for producing a reference pulse of known time duration, said reference pulse producing means being coupled through circuit means to adjustable means whereby the time duration of the reference pulse is linearly proportional to the position of said adjustable means;

d. means for applying the output of said reference pulse producing means to the other input of said comparison means; and

e. synchronizing means coupled to said reference pulse producing means and said means applying unknown pulses for synchronizing the production of a reference pulse with the presence of an unknown pulse;

f. whereby said comparison means provides an indication of whether the time duration of the unknown pulse is less than or greater than the duration of the reference pulse.

4,002,980

RELAY STATION IN A TELECOMMUNICATIONS TRANSMISSION SYSTEM

Rudolf Herz, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

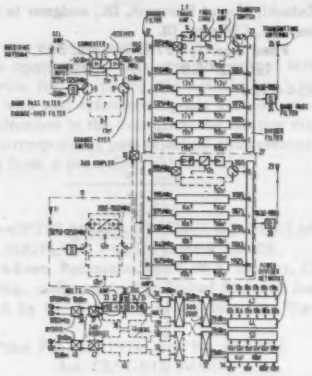
Continuation of Ser. No. 275,707, July 27, 1972, abandoned. This application Jan. 24, 1975, Ser. No. 544,003

Claims priority, application Germany, Aug. 4, 1971, 2139049

Int. Cl.² H04B 7/14

U.S. Cl. 325—3 **3 Claims**

1. A relay station for use in a communications transmission system, including a source of carrier and a superheterodyne receiver in which the oscillations of the received radio frequency band are converted to an intermediate frequency, said receiver connected to said source of carrier, and including a first multiplexer filter circuit connected to the output of the receiver, in which the intermediate frequency band is split into a plurality of sub-bands of separate frequencies which are disposed adjacent one another, a plurality of sub-band amplifiers, each of the intermediate frequencies sub-bands, with its own particular frequencies, being assigned to a respective sub-band amplifier, a plurality of superheterodyne transmitters requiring respective transmitter carriers and connected to the outputs of respective ones of said sub-band amplifiers, a plurality of transmitter amplifiers of the same type with respect to the individual sub-bands connected to the outputs of respective ones of said transmitters, a second multiplexer filter circuit connected to and combining the outputs of all of said



transmitter amplifiers, a common carrier source comprising a stable frequency oscillator which produces the transmitter carriers at the requisite frequencies and at a low power in comparison with the total power required for the individual superheterodyne transmitters, a power divider network, and a carrier amplifier, the output of said oscillator connected to said carrier amplifier and said carrier amplifier connected to the individual superheterodyne transmitters via said power divider network, wherein said carrier amplifier is connected with the receiver carrier source and the transmitter carrier source and also amplifies the carrier for the superheterodyne receiver, and comprising a band filter divider connected to the output of said carrier amplifier, said divider operating to provide suppression of the cross-modulation products of the type $2f_2 - f_1$, where f_1 and f_2 are the frequencies of the carriers for the superheterodyne transmitters and receiver, and operating to provide suppression of the noise power of the oscillator at the signal frequencies in the received frequency range.

4,002,981

DIGITAL CONVERTER FROM DELTA-MODULATED SIGNALS INTO PCM SIGNALS

Ludwig Desiré Johan Eggermont, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 30, 1974, Ser. No. 537,316

Claims priority, application Netherlands, Jan. 21, 1974, 7400764

Int. Cl.² H04B 7/17

U.S. Cl. 325—38 R **7 Claims**

1. An arrangement for converting a compressed delta-modulated signal into a pulse code-modulated signal, said compressed delta-modulated signal being constituted by a succession of code words occurring with a given sampling frequency and each consisting of at least one bit, comprising:

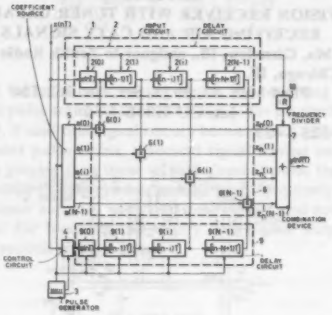
an input circuit comprising a delay circuit comprising a

cascade arrangement of N delay sections, including means in each of said sections for storing a code word of a succession of N code words of said compressed delta-modulated signal, N being a predetermined integer, to which input circuit said compressed delta-modulated signal is applied and in which a predetermined corresponding auxiliary code word is written in said delay circuit for each of said code words of said delta-modulated signal;

a clock pulse generator for generating control pulses which are applied to said delay circuit for controlling the delay time;

a source for a predetermined number of filter coefficients;

a multiplier, responsive to the application of said auxiliary code words and said filter coefficients for generating a



number of second code words, said number of second code words corresponding to said predetermined number of filter coefficients, each of said second code words being related to the digital product of one of said code words of said compressed delta-modulated signal and an associated filter coefficient;

a combination device to which said second code words are applied for addition, controlled by clock pulses from said clock pulse generator; said clock pulses occurring within a period which is an integral multiple of the sampling period; and

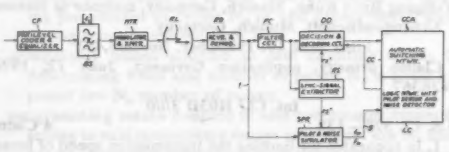
a step size control circuit connected to a second delay circuit having N second delay sections, in each of said sections a step size code word of a succession of N step size code words being stored.

4,002,982

MIXED ANALOG/DIGITAL TRANSMISSION SYSTEM USING RADIO LINK AND METHOD OF OPERATING SAME

Basilio Catania, Fiano (Turin), Italy, assignor to CSELT Centro Studi e Laboratori Telecomunicazioni SpA, Turin, Italy

Filed Nov. 24, 1975, Ser. No. 634,526
Claims priority, application Italy, Nov. 25, 1974, 70425/74
Int. Cl.² H04B 1/00
U.S. Cl. 325—39 **10 Claims**



1. In a receiving station for analog and digital messages transmitted from a remote station via a radio link, in combination:

a demodulator for incoming high-frequency waves modulated with analog message signals in one mode of operation and with digital message signals in another mode of operation, said analog message signals lying outside a predetermined noise-frequency band, said digital message signals lying in a frequency range encompassing said noise-frequency band and at least part of the frequency spectrum of said analog message signals;

a processor for message signals derived from said incoming waves by said demodulator, said processor including detector means for ascertaining the noise level in said noise-frequency band; and

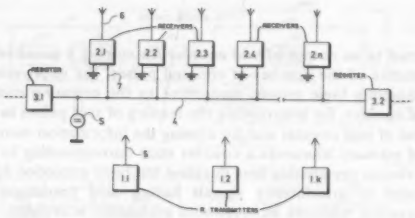
ancillary circuitry connected to the output of said demodulator and resonsive to a predetermined incoming frequency outside said frequency range for supplying a simulated noise frequency to said detector means in said other mode of operation.

4,002,983

VEHICLE-EMERGENCY CALL SYSTEM

Jaroslav Kavalir, and Miroslav Studnicka, both of Prague, Czechoslovakia, assignors to Tesla, narodni podnik, Prague, Czechoslovakia

Filed Feb. 28, 1974, Ser. No. 446,590
Int. Cl.² H08G 1/00
U.S. Cl. 325—54 **11 Claims**



1. An emergency call system for vehicles on public highways comprising a radio transmitter located in each of one or more vehicles, a plurality of fixed road receivers spaced at predetermined distance along the highway and at least one assistance dispatching station remotely located from said receivers, said vehicle transmitter having means for selectively providing a high frequency output of predetermined coded information indicative of one or more emergency conditions, said road receivers having an input tuned to the output frequency of the vehicle transmitter and a signal generator responsive to the receipt at said input of said predetermined coded information of said vehicle transmitter, said signal generator producing a coded output signal indicative of the given road receiver combined with the coded information indicative of the emergency condition received from said vehicle transmitter, and means for transmitting the combined coded signal, said dispatching station having means for receiving, and decoding said combined coded signal into independent indicia signifying the emergency condition and the given road receiver.

4,002,984

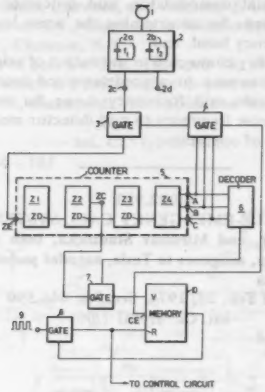
CIRCUIT ARRANGEMENT FOR DETERMINING THE TIME DURATION OF RECEIVED OSCILLATIONS

Wülf-Christian Streckenbach, Hemmingen, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt, Germany

Filed Nov. 26, 1975, Ser. No. 636,223
Claims priority, application Germany, Nov. 27, 1974, 2456005
Int. Cl.² H04B 1/06
U.S. Cl. 325—392 **10 Claims**

1. In a circuit arrangement for evaluating a received signal

of a predetermined frequency, and whose maximum possible time duration is predetermined, by determining the time duration of the signal of said predetermined frequency, said circuit arrangement including a counter, means responsive to said received signal for feeding pulses of a constant frequency to the counting input of said counter to cause same to count during the time said signal of predetermined frequency is being received, and a memory means having its input connected to an output of said counter for storing a count representative of the number of counted pulses, the improvement comprising logic means, responsive to the counting state of said counter, for interrupting the feeding of said pulses to said input of said counter and for erasing the information stored in said memory whenever a counter state corresponding to said maximum permissible time duration has been exceeded due to receipt of interference signals having said predetermined frequency, whereby an erroneous evaluation is avoided.

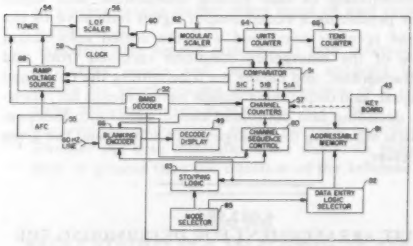


4,002,985

CHANNEL SELECTION INDICATOR FOR MEMORY TUNING SYSTEM

Richard G. Merrell, Darien, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Jan. 12, 1976, Ser. No. 648,558
Int. Cl.² H04B 1/16
U.S. Cl. 325—455 **5 Claims**



1. A television tuning system including:

counting means, generating sequential channel numbers for tuning all channels;

display means coupled to said counting means displaying the tens and units digits of generated channel numbers;

read/write memory means coupled to said counting means accessed by said generated channel numbers and having a plurality of addressable locations for storage and recall of signals related to selected channel numbers;

mode selection means coupled to said counting means and said memory means for establishing a program mode for storage of said signals and an operate mode for recall from said memory means of said signals to cause tuning to channels corresponding to the addresses of individual locations of said memory means;

a clock means generating timing pulses at predetermined rates;

indicator means coupled to said memory means indicating storage of said signals; and

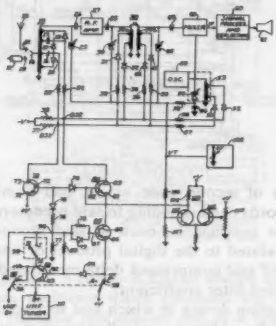
blanking encoder means coupled between said clock means and said indicator means for causing a distinctive illumination sequence in said indicator means for distinguishing between selected and non-selected channel numbers.

4,002,986

TELEVISION RECEIVER WITH TUNER CAPABLE OF RECEIVING AIR AND CATV SIGNALS

John Y. Ma, Glenview, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Mar. 27, 1975, Ser. No. 562,534
Int. Cl.² H04B 1/16
U.S. Cl. 325—459 **16 Claims**



1. A television receiver for receiving, with a single tuner, both airborne and cable television signals lying in three or more frequency bands comprising: a tuner having tunable stages each including an inductive reactance and a varactor diode exhibiting capacitance variations as a function of applied DC tuning voltage, the range of capacitance variation being insufficient, in conjunction with said inductive reactance, to enable said tuner to receive all of said television signals; means for coupling said television signals to said tuner without frequency conversion; and bandswitch means in said television receiver for adjusting the values of said inductive reactances in said tunable stages for television signals lying in different ones of said frequency bands to permit substantially the same magnitude tuning voltage to tune to more than one of said television signals.

4,002,987

CIRCUIT ARRANGEMENT FOR LIMITING THE TRANSMISSION SPEED OF DATA SIGNALS

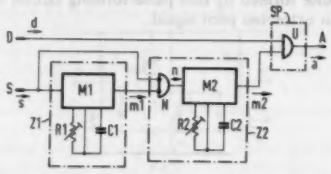
Wolfgang Haus Kuhn, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed June 10, 1975, Ser. No. 585,495
Claims priority, application Germany, June 12, 1974, 2428367
Int. Cl.² H03D 3/00
U.S. Cl. 328—138 **4 Claims**

1. In apparatus for limiting the transmission speed of binary data signals wherein a first input to the apparatus is supplied with the data signals and a second input is supplied with associated element pulse trains which have a predetermined pulse duration when their repetition frequency is equal to a prede-

termined limit frequency and wherein binary outut signals corresponding to said data signals are emitted when said repetition frequency does not exceed said limit frequency, the improvement comprising:

a first timing means having inputs for receiving said element pulse trains and for producing a first signal having pulse durations equal to the pulse durations of said element pulse trains at said predetermined limit frequency.



second timing means having inputs for receiving said element pulse trains and said first signal for producing therefrom, if said first signal occurs between two pulses of said element pulse trains, a second signal having pulse durations greater than those of said element pulse train corresponding to said predetermined limit frequency and

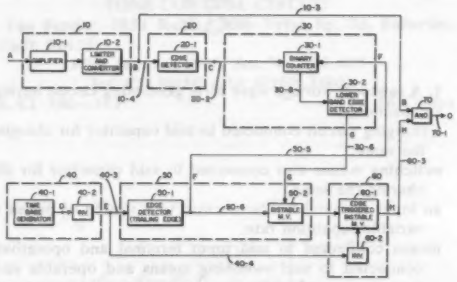
gate means supplied with said data signals and said second signal for blocking the binary data signal output when said second signal occurs.

4,002,988

PROGRAMMABLE HIGH PASS DIGITAL FILTER OF ANALOG SIGNAL

Carlos D. Cardon, and Lawrence P. Griffone, both of Salt Lake City, Utah, assignors to Sperry Rand Corporation, New York, N.Y.

Filed July 29, 1975, Ser. No. 600,018
Int. Cl.² H03K 9/06; H03D 3/04
U.S. Cl. 328—138 **6 Claims**



1. A programmable high pass digital filter of an analog signal, comprising:

means receiving an input analog signal of a frequency F_A for generating a binary digital signal of a frequency F_A therefrom;

counting means coupled to said receiving means for counting the number of cycles N_A of said binary digital signal during a preset sample time T_S;

comparator means coupled to said counting means for determining when said number of pulses N_A is equal to a preset low N_L number of pulses;

programming means coupled to said comparator means for setting in said comparator means said preset low N_L number of pulses that defines a preset lower limit of a preset passable high band;

first memory means responsively coupled to said comparator means for generating as the alternative output signals, an output True signal or an output False signal indicating that said counting means has counted a number of pulses N_A of said binary digital signal that is within or without respectively, said preset passable high band;

first gating means;

means coupling said binary digital signal as a first input to said first gating means;

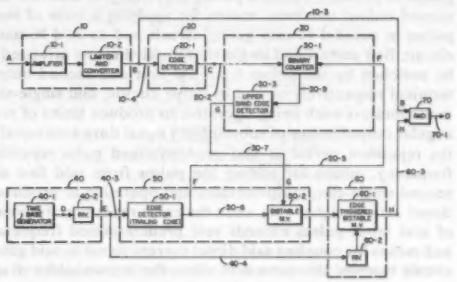
means coupling said first memory means to said first gating means for alternatively coupling said True output signal or said False output signal as a second input to said first gating means, said True output signal or said False output signal enabling or disabling said first gating means to provide or not to provide, respectively, as an output signal therefrom said binary digital signal.

4,002,989

PROGRAMMABLE LOW PASS DIGITAL FILTER OF ANALOG SIGNAL

Carlos D. Cardon, and Lawrence P. Griffone, both of Salt Lake City, Utah, assignors to Sperry Rand Corporation, New York, N.Y.

Filed July 29, 1975, Ser. No. 600,019
Int. Cl.² H03K 9/06; H03D 3/04
U.S. Cl. 328—138 **6 Claims**



1. A programmable low pass digital filter of an analog signal, comprising:

means receiving an input analog signal of a frequency F_A for generating a binary digital signal of a frequency F_A therefrom;

counting means coupled to said receiving means for counting the number of cycles N_A of said binary digital signal during a preset sample time T_S;

comparator means coupled to said counting means for determining when said number of pulses N_A is equal to a preset high N_H number of pulses;

programming means coupled to said comparator means for setting in said comparator means said preset high N_H number of pulses that defines the minimum number of pulses that exceeds the upper limit of a preset passable low band;

first memory means responsively coupled to said comparator means for generating as the alternative output signals, an output True signal or an output False signal indicating that said counting means has counted a number of pulses N_A of said binary digital signal that is within or without, respectively, said preset passable low band;

first gating means;

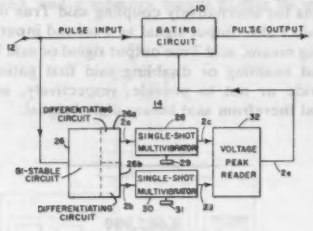
means coupling said binary digital signal as a first input to said first gating means;

means coupling said first memory means to said first gating means for alternatively coupling said True output signal or said False output signal as a second input to said first gating means, said True output signal or said False output signal enabling or disabling said first gating means to provide or not to provide, respectively, as an output signal therefrom said binary digital signal.

4,002,990
ELECTRONIC PULSE FILTERING SYSTEM

Ellis L. Roney, 171 Jardin Drive, Los Altos, Calif. 94022

Filed July 22, 1957, Ser. No. 673,472
Int. Cl.² H03K 9/06; H03D 3/02
U.S. Cl. 328—138 3 Claims

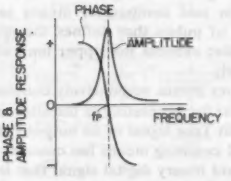


1. A pulse filtering system adapted to pass to an output circuit only those pulses of a train of substantially uniformly spaced input pulses whose repetition frequency exceeds a predetermined frequency, said system comprising, a normally closed gating circuit, a bi-stable circuit having first and second output terminals operative in response to a train of input pulses to produce outward pulses alternately at said first and second output terminals, means for applying a train of input pulses in parallel to said gating circuit and to said bi-stable circuit, first and second single-shot multivibrators arranged to be switched by the pulses from the first and second output terminal respectively of said bi-stable circuit, said single-shot multivibrators each being operative to produce trains of rectangular output pulses of substantially equal durations equal to the repetition period at said predetermined pulse repetition frequency, means for adding the pulses from said first and second single-shot multivibrators and operative to produce a direct current signal only when the pulse repetition frequency of said input pulses exceeds said predetermined frequency, and means for coupling said direct current signal to said gating circuit to open the same and allow the transmission of said input pulses therethrough.

4,002,991
PILOT SIGNAL EXTRACTING CIRCUITRY

Minoru Ogita, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Jan. 2, 1976, Ser. No. 646,049
Claims priority, application Japan, Jan. 29, 1975, 50-12432[U]; May 15, 1975, 50-63707[U]
Int. Cl.² H03B 1/00; H04B 1/68; H03D 3/18
U.S. Cl. 328—139 9 Claims



1. A pilot signal extracting circuitry for extracting a pilot signal from a composite signal consisting of plural signals modulated by a suppressed carrier modulation system, comprising:

a synchronous signal generating circuit for receiving said composite signal and for thereby generating a synchronous signal which is synchronous with the pilot signal contained in said composite signal;

a synchronous detector circuit for receiving said synchronous signal and said composite signal and for thereby generating a DC voltage having a value proportional to the level of said pilot signal contained in said composite signal; and

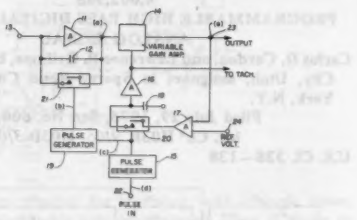
a pulse-forming circuit for receiving said synchronous signal and said DC voltage and for thereby forming a pulse which is synchronous with said synchronous signal and which has a magnitude proportional to the value of said DC voltage,

said pulse formed by said pulse-forming circuit being used as an extracted pilot signal.

4,002,992
AMPLITUDE CONTROL FOR SAWTOOTH WAVE FORM

David I. Spalding, Epping, Australia, assignor to Applied Power Australia Limited, Canberra City, Australia

Filed Sept. 22, 1975, Ser. No. 616,165
Int. Cl.² H03K 4/10
U.S. Cl. 328—181 5 Claims



1. A sawtooth voltage wave form generating circuit having:

a capacitor,

a charging circuit connected to said capacitor for charging the same,

switching means also connected to said capacitor for discharing the same,

an input terminal for connection to a source of pulses of variable repetition rate,

means connected to said input terminal and operatively connected to said switching means and operable each time that one of said pulses is applied to said input terminal to cause said switching means to discharge said capacitor,

an output terminal for said circuit,

a variable gain amplifier connected between said capacitor and said output terminal for variably amplifying the voltage across said capacitor and applying the same to said output terminal,

voltage responsive means connected to said output terminal for determining the magnitude of the voltage at said output terminal,

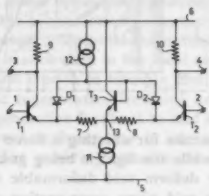
means connected to said variable gain amplifier for controlling the gain thereof,

and means connected to said voltage responsive means and said gain controlling means and effective each time that a pulse is received at said input terminal to cause said voltage responsive means to adjust said gain controlling means if the output voltage at the time of occurrence of the pulse does not have a predetermined value.

4,002,993
DIFFERENTIAL AMPLIFIER

Rudy Johan van de Plassche, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed June 25, 1975, Ser. No. 590,139
Claims priority, application Netherlands, July 8, 1974, 7409191
Int. Cl.² H03F *3/68*
U.S. Cl. 330—30 D 13 Claims

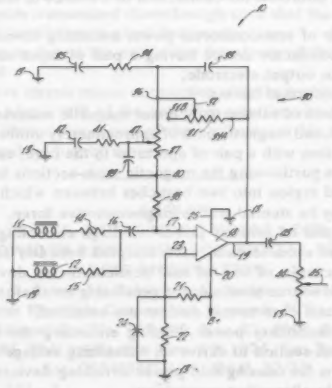


6. A differential amplifier comprising first and second transistors of the same conductivity type, resistor means connecting the emitters of each of said transistors to a first common junction point, input means for applying an input signal to the base of at least one of said first and second transistors, first and second semiconductor junctions connected in series opposition between the emitters of said first and second transistors with a second common junction formed between the two semiconductor junctions, a first current source coupled to said second common junction for applying current to said semiconductor junctions, a third transistor with its emitter coupled to the first common junction, a second current source coupled to the third transistor so as to determine the quiescent current setting of the third transistor, and means for coupling the base of the third transistor to the second common junction so that the quiescent current setting of the first and second transistors varies as a function of the input signal.

4,002,994
TONE CONTROL CIRCUIT

C. Leo Fender, 2851 Rolling Hills Drive Sp. 33, Fullerton, Calif. 92635

Filed Jan. 26, 1976, Ser. No. 652,409
Int. Cl.² H03F *1/36*; G10H *3/00*
U.S. Cl. 330—107 14 Claims

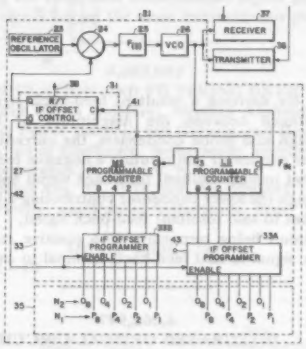


1. A tone control circuit comprising:
an operational amplifier having an input and an output; and
a negative feedback circuit connected between said output and said input, said feedback circuit comprising:
a first variable resistor, a second resistor having a manually movable tap, and a third resistor connected in series between said output and said input;
a first capacitor connected across said first resistor;
a fourth resistor connected between a first junction between said first and second resistors and ground;
a fifth resistor and a second capacitor connected in series between said manually movable tap of said second resistor and ground; and
a third capacitor connected between said manually movable tap of said second resistor and a second junction between said second and third resistors.

4,002,995
DIGITAL FREQUENCY SYNTHESIZER HAVING SELECTABLE FREQUENCY OFFSET BETWEEN TRANSMIT AND RECEIVE FREQUENCIES

L. J. Reed, Mesa, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed July 7, 1975, Ser. No. 593,893
Int. Cl.² H03B *3/04*
U.S. Cl. 331—1 A 4 Claims



1. In a frequency synthesizer of the type including a phase locked loop for providing a first frequency output or a second frequency output the frequency of which is set off from that of the first frequency output by an intermediate frequency, the improvement which comprises:
presetting means for enabling said synthesizer to selectively generate one of the first and the second frequency outputs; and
programmable means coupled to said presetting means for programmably setting the value of said intermediate frequency to any desired frequency within the capabilities of the frequency synthesizer.

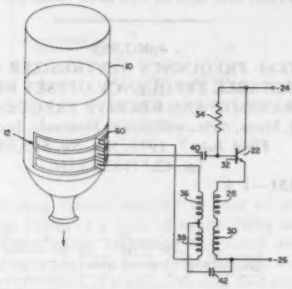
4,002,996
LEVEL DETECTOR USING OSCILLATOR CIRCUIT WITH TWO CAPACITIVE PROBES

Leonard Klebanoff, Willowdale, and Donald Binnee, Richmond Hill, both of Canada, assignors to Elkay Electronics Ltd., Agincourt, Canada

Filed June 18, 1975, Ser. No. 587,989
Int. Cl.² A61M *5/14*; G01F *23/26*; H03B *5/12*
U.S. Cl. 331—65 7 Claims

1. A device for detecting a predetermined level of flowable material in a closed container by emitting an oscillation comprising
a circuit,
said circuit having an amplifier with a feed-back terminal,
a feed-back network including two vertically spaced apart probe condensers each having an open dielectric space,
means for connecting said feedback terminal to said feedback network,
said probe condensers each being in different feed-back paths of said feed-back network,

said probe condensers each having a similar plate configuration and said feed-back paths being similar whereby the magnitude of the current through each of said condensers is substantially the same when the open dielectric space of said two probe condensers is filled with the same dielectric material and is substantially different when the dielectric space of one probe condenser is filled with different dielectric material to the dielectric space of the other probe condenser,



means for deriving a resultant feed-back signal from the difference between the magnitudes of the currents through said probe condensers, the current through the upper condenser contributing a negative feed-back component to said resultant feed-back signal and the current through the lower condenser contributing a positive component to said resultant feed-back signal,

said circuit being responsive to a positive resultant feed-back signal to said feed-back terminal to oscillate.

4,002,997

INTEGRATED OPTICAL CIRCUIT

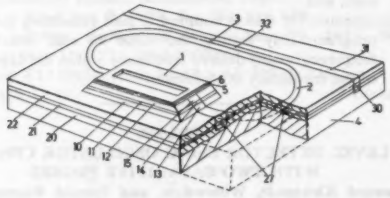
George H. B. Thompson, Harlow, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Sept. 4, 1975, Ser. No. 610,342

Claims priority, application United Kingdom, Oct. 29, 1974, 46741/74

Int. Cl.² H01S 3/19

U.S. Cl. 331—94.5 H **6 Claims**



1. An integrated optical circuit comprising a heterostructure injection laser having an optical resonator and an active optical gain region, said optical resonator being spaced apart from said optical gain region and comprising a closed loop.

4,002,998

EXTERNALLY CONTROLLABLE MINIATURE LASERS

Esther M. Conwell, Rochester, and Dorian Kermisch, Penfield, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 10, 1975, Ser. No. 621,313

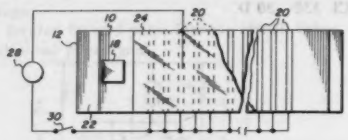
Int. Cl.² H01S 3/082

U.S. Cl. 331—94.5 C **22 Claims**

1. A laser comprising:

an optical wave guide, said wave guide being formed of a deformable material of a given cross-section, said deformable material being a material being capable of guiding light at a predetermined wave length therethrough,

laser active material in said deformable material, a pumping light source to which the laser active material is responsive, and



deforming means for exerting a force on said deformable material while the light is being guided therethrough to physically deform said deformable material to cause a change in said given cross-section such as to produce laser feedback.

4,002,999

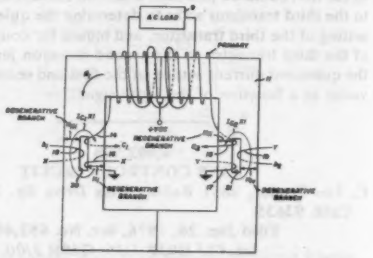
STATIC INVERTER WITH CONTROLLED CORE SATURATION

Joseph P. Hesler, Liverpool, and Samuel M. Korzekwa, Baldwinsville, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,564

Int. Cl.² H03K 3/281

U.S. Cl. 331—113 A **10 Claims**



1. A static inverter comprising:

a. input terminals for connection to a source of d.c. potentials,

b. a pair of semiconductor power switching devices, each semiconductor device having a pair of input electrodes and an output electrode,

c. a transformer having

1. a core of substantially linear magnetic material having a closed magnetic path of approximately uniform cross-section with a pair of apertures in the core, each aperture partitioning the magnetic cross-sections in a localized region into two branches between which the flux may be steered with a magnetomotive force,

2. a pair of primary power windings encircling the full core cross-section, each coupled between an output electrode of one of said semiconductor devices and said source terminals for generating an alternating flux in said core as said devices are switched,

3. a secondary power winding encircling the full core cross-section to derive an alternating voltage output,

d. means for causing said power switching devices to conduct in alternation comprising:

1. a first pair of regenerative feedback windings, one winding (R_1) passing through the first aperture, the other winding (R_2) passing through the second aperture, and each winding (R_1 and R_2) encircling a first branch,

2. a second pair of degenerative feedback windings, one winding (D_1) passing through the first aperture, and the other winding (D_2) passing through the second aperture and each winding (D_1 and D_2) encircling a second branch,

the first regenerative (R_1) and the first degenerative (D_1) winding connected in series opposition between the input electrodes of the first semiconductor device and the second regenerative winding (R_2) and the second degenerative winding (D_2) being connected in series opposition between the input electrodes of the second semiconductor device, and

3. means to cause a differential magnetization rate higher in each first branch than in the local second branch to cause said first branch to saturate first, said saturation removing the regenerative feedback and applying unopposed degenerative feedback to said input electrodes to cause a reverse input bias in advance of full core saturation thus avoiding stresses on said switching device.

4,003,000

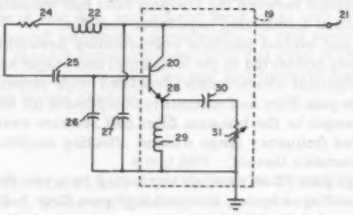
SINUSOIDAL OSCILLATOR WITH ELECTRONICALLY VARIABLE FREQUENCY

Frank J. Sordello, Los Gatos, and Robert L. Cloke, Santa Clara, both of Calif., assignors to Sperry Rand Corporation, New York, N.Y.

Filed May 27, 1975, Ser. No. 581,091

Int. Cl.² H03B *3/04, 5/12*

U.S. Cl. 331—117 R **10 Claims**



1. A variable frequency sinusoidal oscillator comprising:

an amplifier system;

a feedback circuit for the amplifier system, said feedback circuit and said amplifier system including means for causing a phase shift of three hundred sixty degrees in signals transmitted therethrough such that the oscillaator will oscillate at a given frequency;

means to detect the oscillation frequency of the oscillator; and

reactive circuit means connecting with the transistor to vary the phase shift of the amplifier gain thereby to vary the oscillation frequency of the oscillator within a predetermined frequency range.

4,003,001

MULTI-LINE, MULTI-MODE MODULATOR USING BANDWIDTH REDUCTION FOR DIGITAL FSK AND DPSK MODULATION

Gardner D. Jones, Jr., Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 525,699, Nov. 21, 1974, Pat. No. 3,958,191. This application Nov. 10, 1975, Ser. No. 630,246

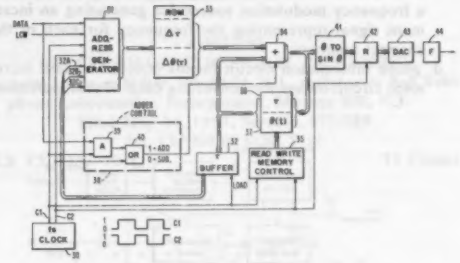
Int. Cl.² H03C *3/02*; H04L *27/20*

U.S. Cl. 332—1 **9 Claims**

9. A method for digitally generating narrow bandwidth FSK modulated signals comprising the steps of:

storing a predetermined trajectory for the instantaneous frequency transitions in the form of n discrete digital numerical values;

selecting within each baud time in which a frequency transition occurs each of said n discrete numerical values at least once, said selections being determined as a function of the interbaud time;



calculating the instantaneous phase in digital form based on each selected numerical value; and

converting the calculated instantaneous digital phase to an analog signal having the same instantaneous phase.

4,003,002

MODULATION AND FILTERING DEVICE

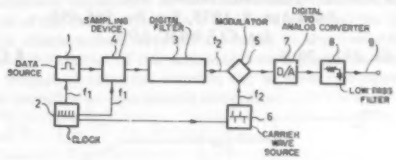
Wilfred André Maria Snijders; Nicolaas Alphonsus Maria Verhoeckx; Petrus Josephus van Gerwen, and Hendrik Arie van Essen, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 27, 1975, Ser. No. 608,392

Claims priority, application Netherlands, Sept. 12, 1974, 7412095

Int. Cl.² H03K *7/00*

U.S. Cl. 332—10 **1 Claim**



1. Modulation- and filtering device for digital signals comprising means for filtering the digital signals and means for modulating the filtered digital signals, on a modulator carrier wave characterized in that signal samples of the digital input signal, which occur at a first sampling frequency are converted in a digital filter to signal samples of a second sampling frequency, which is twice as high as the modulator carrier wave frequency and the signal samples at the second sampling frequency are modulated in the modulator with signal samples of the modulator carrier wave which occur at the same second sampling frequency the digital filter being adapted to have a band-pass filter characteristic.

4,003,003

MULTICHANNEL DIGITAL SYNTHESIZER AND MODULATOR

Allen L. Heaberlin, 5737 Avenida Sanchez, San Diego, Calif. 92124

Filed Nov. 18, 1975, Ser. No. 633,147

Int. Cl.² H03K *7/00*

U.S. Cl. 332—11 R **8 Claims**

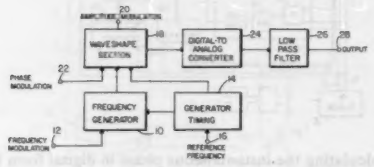
1. Apparatus for generating a coherent multichannel signal comprising:

a. a reference frequency source for providing signals at a predetermined reference frequency;

b. counter means coupled to said reference frequency source for consecutively sequencing through said reference signals;

c. increment circuit means having a first input coupled to said counter means and having a second input coupled to a frequency modulation source for generating an increment signal representing the frequency for each of the channel numbers;

d. phase information circuit means coupled to said increment circuit means for converting each of said increment



signals into an output signal representing the phase information at each sampling point for each channel;

e. waveshape circuit means coupled to said phase information circuit means and being responsive to each of said output signals and its associated phase information for converting said phase information into digital amplitude information signals;

f. and digital-to-analog converter means coupled to said waveshape circuit means for converting said digital signals into an analog signal that is the sum of said predetermined number of consecutive signals.

4,003,004

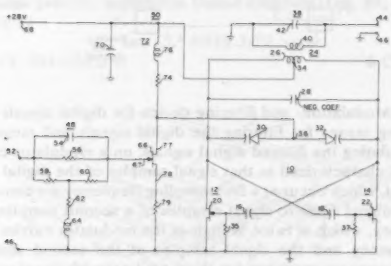
FREQUENCY MODULATED OSCILLATOR

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Martial A. Honnell, Auburn, Ala.

Filed Apr. 9, 1975, Ser. No. 566,495

Int. Cl.² H03C *3/20*

U.S. Cl. 332—30 V **8 Claims**



1. A frequency modulated oscillator comprising:

a radio frequency oscillator

modulation means comprising a varactor coupled to said oscillator for varying the frequency of said oscillator non-linearly, deviating in a first direction of deviation from a linear variation with respect to a signal applied to said varactor; and

signal means comprising a field effect transistor, and responsive to an input signal applied to said field effect transistor, for applying, as an output of said field effect transistor, a signal to said varactor which varies non-linearly in amplitude with respect to said input signal due to a non-linearity of said field effect transistor, deviating in a second, opposite, direction of deviation from a linear variation when compared with a deviation from linearity effected by said varactor;

whereby the frequency of output of said oscillator varies substantially linearly with the amplitude of said input signal applied to said field effect transistor.

4,003,005

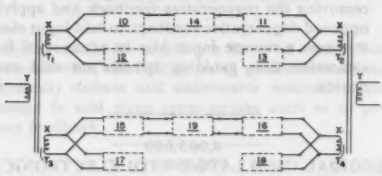
BIDIRECTIONAL CONSTANT IMPEDANCE LOW PASS/HIGH PASS FILTER CIRCUIT

Samir Mukherjee, Scottsville, N.Y., and William Ford Shepherd, Raleigh, N.C., assignors to Electro Networks, Division of Chloride, Inc. N. American Operations, Tampa, Fla.

Filed Nov. 24, 1975, Ser. No. 634,351

Int. Cl.² H03H *7/04, 7/38, 7/46*

U.S. Cl. 333—8 **10 Claims**



1. A bidirectional filter circuit having an input and an output and substantially constant input and output impedance characteristics over the desired frequency range, comprising:

a low-pass filter network connected between filter input and output having identical low-pass filter half sections cascaded back-to-back with a symmetrical all-pass network interposed therebetween, the all-pass network providing isolation between the low-pass filter half sections and the desired terminating impedance therefor,

first and second identical compensating networks respectively connected to the filter input and output and having reciprocal characteristic functions with respect to the low-pass filter half sections to compensate for impedance changes in the low-pass filter half sections over the desired frequency range without affecting amplitude characteristics thereof,

a high-pass filter network connected between filter input and output having identical high-pass filter half sections cascaded back-to-back with a symmetrical all-pass network interposed therebetween, the all-pass network providing isolation between the high-pass filter half sections and the desired terminating impedance therefor,

third and fourth identical compensating networks respectively connected to the filter input and output and having reciprocal characteristic functions with respect to the high-pass filter half sections to compensate for impedance changes in the high-pass filter half sections over the desired frequency range without affecting amplitude characteristics thereof.

4,003,006

PILOT TONE CONTROLLED ADAPTIVE AMPLITUDE EQUALIZER

Gordon James Mandeville, Lawrence, Mass., and Dale Irving McLean, Hampstead, N.H., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 6, 1975, Ser. No. 619,674

Int. Cl.² H04B *3/10*

U.S. Cl. 333—16 **11 Claims**

1. Apparatus for adaptively equalizing the amplitude of a communications channel, said channel having impressed thereon a message load of predetermined bandwidth, first and second pilot tones respectively positioned proximate the upper and lower edges of said band, and at least a third pilot tone positioned proximate the center of said band, said apparatus comprising, in tandem:

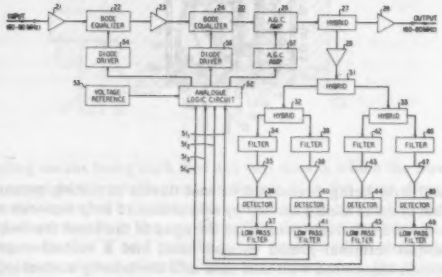
means for shaping the frequency characteristic of a first portion of said band;

means for shaping the frequency characteristic of a second portion of said band, said first and second portion shaping means having substantially no shaping effect on that portion of the band shaped by the other; and

a variable-gain amplifier connected downstream of said first and second portion shaping means, said apparatus further comprising:

means, connected to the output of said amplifier, for filtering said first, second and third pilot tones from said message load;

means, connected to the output of said filtering means, for detecting said first, second and third pilot tones;



a source of a reference potential; and means, connected to said reference source and to said detecting means, for selectively adjusting the gain of said variable gain amplifier and/or the slope characteristic of said first and second portion shaping means, in an offsetting manner, as the levels of said first, second and third tones vary, whereby the overall amplitude characteristic of said communications channel remains substantially flat even in the presence of frequency-selective and non-frequency-selective fading in said channel.

4,003,007

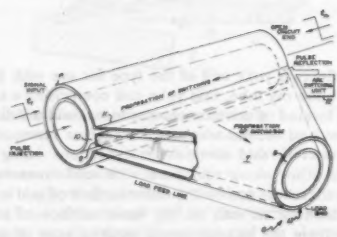
HIGH POWER PULSE COMPRESSION TECHNIQUES

Alexander G. Stewart, Columbia, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 13, 1975, Ser. No. 631,793

Int. Cl.² H01P *1/00;* **H03K** *5/04*

U.S. Cl. 333—20 **13 Claims**



1. A method of compressing a high intensity electromagnetic energy pulse comprising the steps of:

injecting the electromagnetic energy pulse into a transmission line, the pulse length being approximately at least as small as the electrical length of the transmission line but longer than the transverse dimension of the line,

activating a switching unit along the length of the transmission line causing the pulse energy to exit along the length of the line instead of out the end, and

discharging the pulse energy onto a discharge line at least over an extent and at times along the transmission line so that the pulse energy at various points along the line arrives at a load end of the discharge line at approximately the same time, thereby compressing the high intensity electromagnetic pulse.

4,003,008

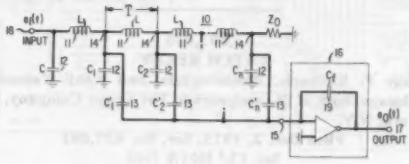
ELECTROMAGNETIC SIGNAL PROCESSOR

Gabriel Lorimer Miller, Westfield, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 14, 1975, Ser. No. 577,289

Int. Cl.² H03H *9/26, 9/32*

U.S. Cl. 333—70 T **11 Claims**



1. A filter comprising a) an electromagnetic transmission line of time delay, T, the transmission line including series inductance and shunt capacitances to ground along its length resulting in a characteristic impedance, (b) sampling means for extracting signal information along at least a portion of the transmission line and (c) summing means for summing the extracted signal information CHARACTERIZED IN THAT the sampling means includes at least one portion of the shunt capacitance at each position along the line at which the signal information is extracted and the summing means includes at least one summing device, which summing device possesses an imput impedance to ground which is small compared to the characteristic impedance of the transmission line, which said portion of the shunt capacitance is chosen such that the transmission characteristic between the input to the transmission line and the output of the summing means possesses the desired frequency response wherein the at least one summing device includes an operational integrator.

4,003,009

RESONANT CIRCUIT USING VARIABLE CAPACITANCE DIODE

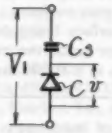
Selichi Watanabe, Machida, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Mar. 24, 1975, Ser. No. 561,298

Claims priority, application Japan, Mar. 25, 1974, 49-33224

Int. Cl.² H03H *5/12;* **H03J** *3/06, 5/04*

U.S. Cl. 334—15 **8 Claims**



1. A resonance circuit comprising:

a. an inductive means;

b. a capacitive means having a semiconductor junction element which includes a layer of intrinsic semiconductor material adjacent the junction and which satisfies the equation

$$C\frac{d^2C}{dV^2}=\frac{4}{3}\left(\frac{dC}{dV}\right)^2$$

where C is the capacitance of said element when a voltage V is applied thereto and a junction of said junction element is reverse biased and C′ is a constant,

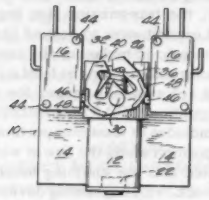
c. means for applying a signal to said element, said C′ is equal to said C, and $C=C_D(V+V_D)^{-3}$ is satisfied where C_D and V_D are constants, and said element has an impurity concentration proportional to $5/x\ 3$, where x is the distance from said junction, and a low doping profile exists in the neighborhood of said junction.

4,003,010

LATCH RELAY

George F. Kuchuris, Bloomingdale, and Kenji Yatsushiro, Chicago, both of Ill., assignors to The Singer Company, New York, N.Y.

Filed Dec. 2, 1975, Ser. No. 637,081
Int. Cl.² H01H *3/42*
U.S. Cl. 335—190 **10 Claims**



1. Apparatus comprising

a frame,

a relay mounted in the frame and including a coil and a plunger,

a spring biasing the plunger out of the coil,

a generally flat cam member pivotally mounted on the frame for rocking movement between two positions and having an external cam surface and an opening therein,

a pin projecting from the plunger into said cam opening,

said opening providing an outer limit stop and an impact surface for said pin on each side of the cam centerline,

said pin engaging either of the limit stops when the coil is de-energized and moving into engagement with the impact surface on the same side of the centerline when the coil is energized to cause the cam member to rock to a new position,

means operative upon de-energization of the coil to cause the pin to move past the cam centerline into engagement with the other limit stop,

a device mounted on the frame adjacent the cam member and having an actuator spring loaded into engagement with the external cam surface,

said external cam surface being contoured so the actuator acting thereagainst holds the cam member in either of said two positions in a stable manner.

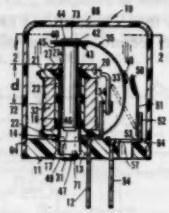
4,003,011

ELECTROMECHANICAL SWITCHING DEVICE

Rodney Hayden, Stoney Creek, Canada, assignor to TRW Inc., Cleveland, Ohio

Filed Sept. 4, 1975, Ser. No. 610,201
Claims priority, application Canada, June 18, 1975, 229651
Int. Cl.² H01H *1/12, 51/06*
U.S. Cl. 335—196 **12 Claims**

1. An electromechanical switching device comprising: an insulate base; an input terminal connected to said base; a device actuating means; device actuating means mounting means associated with said base, said mounting means supporting said device actuating means for linear reciprocating movement relative thereto; an arcuately bent armature, said armature being electrically connected to said input terminal and being in the form of a spring metal strip, one end of said armature strip being fixed to said base and the other end of



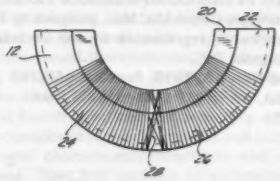
said strip being connected to said device actuating means; a first contact means carried by said armature strip between said ends and relatively proximate the apex of the bend thereof; an output terminal joined to said base; and a second contact means associated with said base and electrically connected to said output terminal; said first contact means being tangentially engageable with said second contact means responsive to movement of said device actuating means relative to said mounting means.

4,003,012

VERTICAL COIL FOR A DEFLECTION YOKE

Bernard Chasens, El Paso, Tex., assignor to General Instrument Corporation, Clifton, N.J.

Filed Oct. 9, 1975, Ser. No. 620,944
Int. Cl.² H01F *5/00*
U.S. Cl. 335—213 **8 Claims**



1. A deflection yoke coil of the type for use with a tri-gun in-line cathode ray tube, said yoke coil comprising a core and a winding formed of continuous wire turns, said winding comprising first and second sections and one or more crossover turns connecting said sections, said sections being spaced from each other along said core with said crossover turns extending therebetween on the outer surface of said core, said sections defining an area on the inner surface of said core extending from the interior to the exterior edge of said core which is substantially devoid of crossover turns.

4,003,013

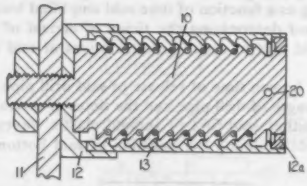
ELECTROMAGNETIC DEVICES

Alec Harry Seilly, North Wembley, England, assignor to Simms Group Research & Development Limited, Birmingham, England

Continuation of Ser. No. 552,801, Feb. 25, 1975, abandoned. This application Mar. 4, 1976, Ser. No. 663,829
Int. Cl.² H01F *7/08*
U.S. Cl. 335—220 **18 Claims**

1. An electromagnetic device comprising a pair of relatively

movable magnetisable members and an electrical winding means through which can be passed an electric current to produce a magnetic field to effect relative movement of the members, in which one of said members defines a plurality of slots disposed in side by side relationship on one face of the said one member, the other said member defining a plurality of projections entering into the said slots respectively and of a smaller width than the slots, at least some of said slots accommodating said electrical winding means, the connection of the

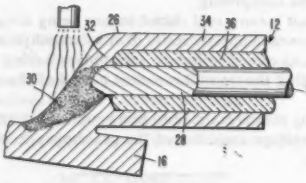


winding means being such that any two slots in which the flow of current in the winding means therein is in the same direction are separated by a slot with a winding means in which the flow of current is in the opposite direction, the arrangement being such that if said members are positioned so that said projections are not centrally disposed in said slots, the members will, upon current being passed through said winding means, be urged relative to each other in an attempt to reduce the size of the smaller gap between each projection and the side faces of the associated slot.

4,003,014
REFRACTORY RESISTANCE TERMINAL

Charles D. Branson, and William D. Long, Jr., both of Greensburg, Pa., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Sept. 25, 1975, Ser. No. 616,799
Int. Cl.² H01C 1/14
U.S. Cl. 338—326 **12 Claims**

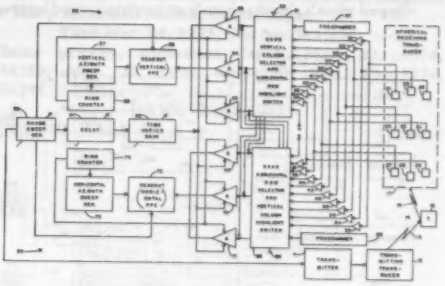


1. A resistance and terminal comprising
an elongated resistance element made from a conductive refractory material which is weakened where subjected to a substantial temperature gradient,
a metal supporting member extending along a segment of the element from one end of the element and at least partially surrounding the segment of the element,
a fused portion having constituents of the supporting member metal and the refractory material joining the one end of the resistant element to the supporting member,
said supporting member having an unfused portion along a substantial portion of the segment providing mechanical support for the element where subject to weakening, and
a layer of solidified-from-melt material interposed between the unfused portion and the segment of the element,
said solidified-from-melt material selected to be compatable with the refractory element and having a coefficient of linear expansion within the range of about 0.5 to 1.5 times the coefficient of linear expansion of the refractory material.

4,003,015
MULTIPATH SONAR SYSTEM

Edward L. Pipkin, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 3, 1975, Ser. No. 593,919
Int. Cl.² G01S 9/66, 7/62
U.S. Cl. 340—3 R **18 Claims**



1. A sonar system, comprising in combination:
first receiving means for receiving a first acoustical signal from an underwater target via a first path sector of the water encompassing said target;
second receiving means for receiving a second acoustical signal from the aforesaid underwater target via a second path sector that is different from said first path sector of the water and which encompasses said target; and
first and second readout means connected to the outputs of said first and second receiving means for reading out images of said target and said first and second water path sectors encompassing it, respectively, said first readout means comprising a data input, a vertical azimuth sweep input, and a range sweep input, and said second readout means comprising a data input, a horizontal azimuth sweep input, and a range sweep input;
said first receiving means comprising a receiving transducer having a plurality of electroacoustical energy converters disposed in a predetermined number of columns and rows, a predetermined plurality of isolation amplifiers connected to the outputs of said electroacoustical energy converters, an adjustable vertical column selector switch connected to the outputs of said predetermined plurality of isolation amplifiers, a plurality of control amplifiers, each having a data input, an on-off control input, a time-varied gain control input, and an output, with the data inputs of said control amplifiers connected to respective ones of a like plurality of outputs of said adjustable vertical column selector switch, said first receiving means further comprising a vertical azimuth sawtooth sweep signal generator having an input and having an output connected to said vertical azimuth sweep input, a ring counter connected to said input of said vertical azimuth sawtooth sweep signal generator for effecting the timing thereof and to said on-off inputs of said isolation amplifiers, and an adjustable range sweep generator connected to said range sweep input.

4,003,016
DIGITAL BEAMFORMING SYSTEM

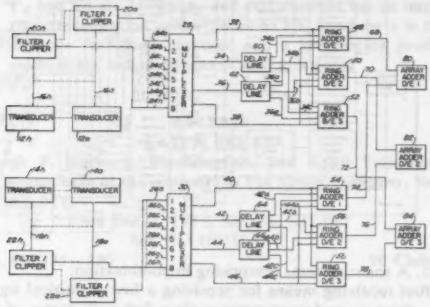
Winslow Rodeck Remley, Fairfax, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 6, 1975, Ser. No. 619,720
Int. Cl.² G01S 3/80
U.S. Cl. 340—6 R **4 Claims**

1. A signal processing system comprising:
a plurality of transducers for providing a plurality of respective output signals, said transducers arranged to form an array exhibiting ring symmetry;

a plurality of filtering and clipping means to filter and clip respective transducer output signals;

a multiplexer having a plurality of input terminals, each of said multiplexer input terminals connected to a respective member of said plurality of filtering and clipping means for receiving filtered and clipped signals, said multiplexer having a plurality of output terminals that is less in number than said input terminals, each of said output terminals adapted for sequentially providing said filtered and clipped signals simultaneously at predetermined intervals;



at least one pair of delay lines connected to respective members of a pair of selected multiplexer output terminals, said pair of delay lines adapted to delay received signals for a simultaneous predetermined period of time; and

an adder connected to said pair of delay lines for receiving the delayed signals and connected directly to a second pair of selected multiplexer output terminals.

4,003,017

CONTINUOUS BIT POSITIONING SYSTEM

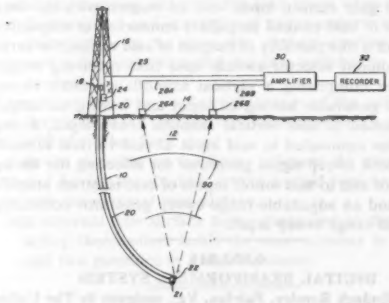
John R. Bailey, Tulsa, Okla., assignor to Senturion Sciences, Inc., Tulsa, Okla.

Continuation-in-part of Ser. No. 371,142, June 18, 1973, Pat. No. 3,817,345. This application June 3, 1974, Ser. No. 475,791

The portion of the term of this patent subsequent to June 18, 1991 has been disclaimed

Int. Cl.² G01V *1/00*; E21B *47/02*

U.S. Cl. 340—15.5 BH **19 Claims**



1. The method of determining the position in the earth of the bottom of a borehole, during rotary drilling of said borehole, including a known length of drill pipe at least one drill collar, jars and bit, comprising:

a. placing a plurality of sensors in the earth in a known geometric pattern above the expected position of the bottom of the borehole, said sensors adapted to detect and transduce the vibrations in the earth to corresponding electrical signals, and amplifying said transduced signals;

b. lifting said drill pipe, drill collar, and jars a selected distance, and suddenly releasing the drill pipe, so that it falls in the borehole until the drill bit strikes the bottom of the well bore, whereby the impact of the drill bit on the bottom of the well bore will generate a first elastic wave in the earth, and the impact of the pipe on the jars will generate a second elastic wave in the earth;

c. determining the time of release of said drill pipe;

d. recording as a function of time said amplified transduced signals and determining the times of arrival of at least either said first or second elastic waves at said sensors; and

e. from the known time of release of said drill pipe and the known length of drill pipe and the times of arrival of said at least either said first or second elastic waves at said sensors, determining the position of said bottom of the borehole.

4,003,018

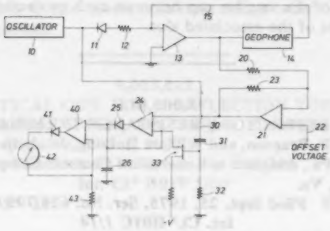
METHOD AND APPARATUS FOR TESTING A PLURALITY OF GEOPHONES

Karl McCormick, Channelview, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 9, 1976, Ser. No. 656,680

Int. Cl.² G01V *1/16*

U.S. Cl. 340—15 **13 Claims**



1. An apparatus for testing a plurality of geophones for malfunctions comprising:

first circuit means, said circuit means being coupled to said geophones to apply a series of constant amplitude current pulses to said geophones, said pulses having a duration exceeding the normal resonant period of the geophones; and

measuring means coupled to said geophones to measure the peak voltage response of the geophones to said current pulses.

4,003,019

PARAMETER DISPLAY AND ALARM INSTALLATION FOR MOTOR-DRIVEN VEHICLES

Roger Philippe Tronel, Residence du 14 Juillet, 42300 Roanne, France

Filed Dec. 3, 1974, Ser. No. 529,059

Claims priority, application France, Dec. 3, 1973, 73.43638; Dec. 3, 1973, 73.43639; July 5, 1974, 74.24764

Int. Cl.² B60Q *1/54*

U.S. Cl. 340—52 F **10 Claims**

1. A parameter display and alarm installation for a motor-driven vehicle having a gear-box associated with the vehicle motor, said gear-box including a tachometric output shaft the rotational speed of which is proportional to the speed of the vehicle, said installation comprising:

a revolution counting device and a speedometer device, a general mileage recorder and a trip recorder operatively connected to said counting device and speedometer device;

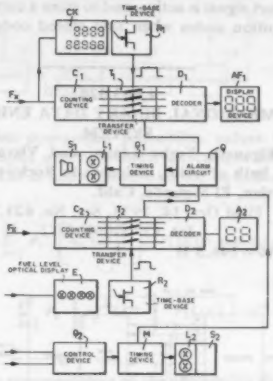
said speedometer device comprising a signal generator associated with said tachometric output shaft for produc-

ing binary signals in accordance with the rotational speed of said output shaft;

said vehicle motor including a rotating element, the rotational speed of which is proportional to the rotational speed of said motor;

said revolution-counting device comprising a second binary signal generator operatively connected to said rotating element;

an electronic transfer device connected to said first and second signal generators and having an "active" condition of predetermined duration for receiving the signals emitted by the related signal generator and for transmitting said signals to at least one decoding device for transforming said signals into a digital form and an "inactive" condition;



said installation further comprising at least one alarm circuit associated with said revolution counter and speedometer devices for indicating when the rotational speed of the motor of the vehicle exceeds a predetermined value and for indicating when the speed of the vehicle exceeds a predetermined value.

4,003,020

DIGITAL SIGNAL TRANSMISSION

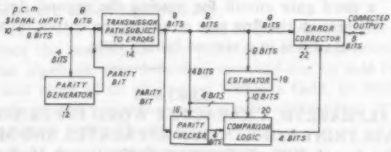
Christopher Keith Perry Clarke, Crawley, England, assignor to The Marconi Company Limited and Standard Telephones & Cables Limited, both of London, England

Filed June 30, 1975, Ser. No. 592,021

Claims priority, application United Kingdom, July 3, 1974, 29516/74

Int. Cl.² G06F *11/10*

U.S. Cl. 340—146.1 AL **19 Claims**



1. A method of detecting errors in a received digital signal which comprises a plurality of words each of which consists of a plurality of bits, the signal having parity bits, wherein the method comprises generating parity bits, one for each of a group of bits of the received signal, to correspond with the received parity bits, comparing the generated parity bits with the corresponding received parity bits, and when the generated and received parity bits differ in respect of a group, estimating a value for each word containing a bit from the respective group, and comparing the estimated value with the received value for the word to detect any word containing an erroneous bit.

4,003,021

LEVEL DETERMINATION FOR OPTICAL CHARACTER READER

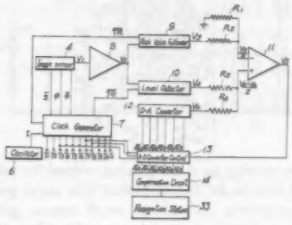
Hiromu Sasaki, Yamatokoriyama; Syoichi Yasuda, Nara, and Humikazu Nagano, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 24, 1975, Ser. No. 561,233

Claims priority, application Japan, Mar. 23, 1974, 49-34289; Mar. 23, 1974, 49-34290; Mar. 23, 1974, 49-34291

Int. Cl.² G06K *9/02*

U.S. Cl. 340—146.3 AG **4 Claims**



1. A level determination system providing quantized information signals for use in an optical character reader for reading information written on a card having a reference portion and an information portion, the improvement comprising:

a photosensor means for scanning said reference and information portions including N photosensitive elements providing N unique video reference signals for said reference portion of said card and N unique video information signals for said information portion of said card, the said information signals being representative of the information written on said card;

storage means having N storage sections therein and responsive to the maximum value of each said N unique video reference signals for storing same in a corresponding one of said N storage sections to thereby store a reference level signal peculiar to the operating conditions of each of said N photosensitive elements in said storage means for each and every card to be read; and

quantizing means responsive to said video signals comparing each of said N video information signals with the corresponding one of said N unique video reference signals in said storage means and providing N quantized information signals as respective functions of said comparisons.

4,003,022

SYMBOL STRING PATTERN RECOGNITION EQUIPMENT

Kousuke Takahashi, and Haruki Kohara, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed July 24, 1975, Ser. No. 598,958

Claims priority, application Japan, Aug. 2, 1974, 49-89278; Nov. 25, 1974, 49-135716; Dec. 23, 1974, 49-2463

Int. Cl.² G06K *9/00*

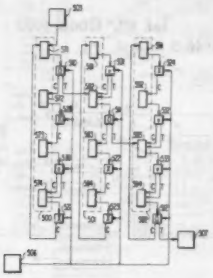
U.S. Cl. 340—146.3 MA **4 Claims**

1. A symbol string pattern recognition equipment comprising:

an external signal generating circuit for generating respective input symbols constituting a symbol string pattern in the form of a string of binary-coded external signals;

at least one internal signal generating circuit for generating an internal signal in response to the symbol string pattern;

a plurality of sequential logic circuits connected to said internal signal generating circuit and controlling travelling paths of the internal signal depending on the external signal, each of said sequential logic circuits consisting of a parallel arrangement of internal shift registers having a plurality of stages adapted to circulate or move the internal signal in either of two directions within the internal shift registers in synchronism with the external signals, and coupling elements coupled between shift registers and between selected stages of shift registers, said coupling elements having a function of shifting the internal signal or erasing the internal signal in the course of shifting or returning the internal signal to an internal shift register, when receiving one of the binary-coded external signals, and said coupling elements having another function of returning the internal signal to the first of said parallel arrangement of said internal shift registers all the time, when receiving the other of the binary-coded external signals;



an external shift register connected to each of the sequential logic circuits; and

a detecting circuit for checking whether or not the internal signal has reached the external shift register, upon completion of the supply of the symbol string pattern.

4,003,023

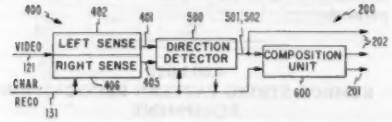
POST-RECOGNITION SEGMENTATION FOR PATTERN-RECOGNITION MACHINES

Gary G. Benson, and Eugene R. Jones, both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 9, 1975, Ser. No. 594,387

Int. Cl.² G06K 9/00

U.S. Cl. 340—146.3 SG **8 Claims**



1. Apparatus for separating adjacent patterns in a system having a pattern-recognition unit responsive to pattern input signals for producing recognition codes at intervals which are substantially independent of the occurrences of said adjacent patterns, said apparatus comprising:

first sense generator means for combining a plurality of said pattern signals so as to produce a left-sense signal indicative of the occurrence of a first side of a potential pattern;

second sense generator means for combining a plurality of said pattern signals so as to produce a right-sense signal indicative of the occurrence of a right side of a potential pattern; and

composition means responsive to said left-sense signal, said right-sense signal and said recognition codes for producing a single output code for each of said adjacent patterns, regardless of the number of said recognition codes produced for said patterns, said composition means including gating means responsive to a plurality of said sense signals for producing start and end signals respectively representing the beginning and the end of each of said adjacent patterns and discriminator means responsive to said start and end signals for selectively storing said recognition codes and for releasing one of said stored recognition codes as said output code, wherein said discriminator means is adapted to store a reject code when said start signal is active, and to store a current one of said recognition codes when said stored code is said reject code.

4,003,024

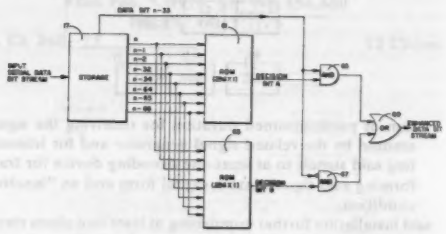
TWO-DIMENSIONAL BINARY DATA ENHANCEMENT SYSTEM

John P. Riganati, Yorba Linda, and Visvaldis A. Vitols, Orange, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 14, 1975, Ser. No. 621,724

Int. Cl.² G06K 9/12

U.S. Cl. 340—146.3 H **6 Claims**



1. A system for enhancing the bits in two-dimensional binary data, said system comprising:

means for sequentially storing a data bit and bits associated therewith in preselected storage locations; and

means for sequentially developing an output bit for each data bit, the state of the output bit being a function of the pattern of the bits stored in the preselected storage locations, said developing means comprising memory means for developing first and second decision bits as a function of the states of the bits associated with the data bit and gating means for selecting one of the first and second decision bits for the output bit as a function of the binary state of the data bit, said gating means comprising:

a first gate circuit for developing the output bit;

a second gate circuit for passing the first decision bit through said first gate circuit as the output bit when the data bit is in a first binary state; and

a third gate circuit for passing the second decision bit through the first gate circuit as the output bit when the data bit is in a second binary state.

4,003,025

ALPHABETIC CHARACTER WORD UPPER/LOWER CASE PRINT CONVENTION APPARATUS AND METHOD

John Joseph Hilliard, Potomac; Philip Joseph Mullan, Rockville, and Walter Steven Rosenbaum, Silver Spring, all of Md., assignors to International Business Machines Corporation, Armonk, N.Y.

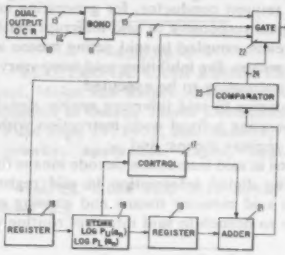
Filed Dec. 24, 1975, Ser. No. 643,976

Int. Cl.² G06K 9/00

U.S. Cl. 340—146.3 S **7 Claims**

1. An apparatus for discriminating upper and lower case alphabetic character fields appearing on the output line of an optical character recognition machine (OCR) as a series of character defining electrical signals, comprising:

a read-only store having an input and an output, said store containing respective upper and lower case $P_L(\alpha_n)$ and



$P_L(\alpha_n)$ print convention probability values therein for conflict, reject and alphabetic characters outputted by the OCR and in accordance with the equations

$$P_c(\alpha_n) = \sum_{i=1}^{26} P_c\left[\alpha_n \mid U(i)\right] P[U(i)] \text{ and } P_L(\alpha_n) = \sum_{i=1}^{26} P_c\left[\alpha_n \mid L(i)\right] P[L(i)]$$

where $P_L(\alpha_n)$ is representative of the probability tht said OCR recognition (α_n) resulted from the scan of an upper case alphabetic character; $P_L(\alpha_n)$ is representative of the probability that said OCR recognition (α_n) resulted from the scan of a lower case alphabetic character; ($U(i)$ is the 1–26 ith upper case alphabetic character; $L(i)$ is the 1–26 ith lower case alphabetic character; $P_c[\alpha_n\ U(i)]$ is the confusion probability of $U(i)$ being read as α_n; $P[U(i)]$ is the probability of $U(i)$ occurring on the document scanned by said OCR in view of the language of the field of characters inscribed on the aforesaid document; $P_c[\alpha_n\ L(i)]$ is the confusion probability of $L(i)$ being read as α_n; and $P[L(i)]$ is the probability of $L(i)$ occurring on the document scanned by said OCR in view of the language of the field of characters inscribed on the aforesaid document;

first circuit means connected said OCR output line to the input of said store whereby a sequence of signals indicative of a field of characters outputted by said OCR, address said store serially a character at a time, to thereby make available serially at said store output, probability values corresponding to the aforesaid serially outputted character signals;

an adder having an input and an output;

second circuit means connecting said store output to the input of said adder, whereby probability values corresponding to the aforesaid serially outputted character signals are added algebraically;

and last means connected to the output of said adder to detect the polarity of the print convention probability value algebraic sum following the read-out by said OCR to said store of all characters within a field, to thereby designate the upper/lower case print convention of the characters within the field.

4,003,026
VAULT SECURITY SYSTEM

Herbert L. Wallerstein, Jr., 1704 Ambassador, Beverly Hills, Calif. 90210

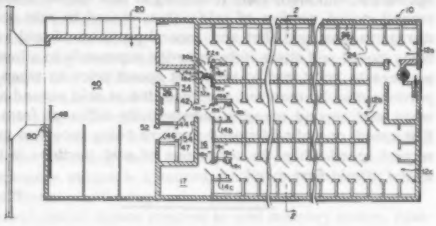
Filed July 7, 1975, Ser. No. 593,267
Int. Cl.² H04Q 3/00
U.S. Cl. 340—149 A **7 Claims**

1. A vault security system, for the storage of valuables and the exclusion of unauthorized persons comprising:

a plurality of corridors each with an entrance;

a plurality of holding means, one of said holding means located at the entrance to each of said corridors for holding an unauthorized person, each of said holding means comprising a room with at least two doors, one of said doors being a corridor door openable so as to allow entry through said entrance into said corridor;

a common hall communicating with said plurality of holding means, one of said doors of said holding means being a hall door openable so as to allow entry into said holding means from said common hall, only one of said doors of said holding means openable at any one time; and

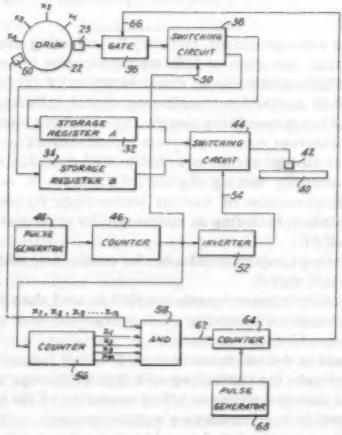


a plurality of access means, each of said access means for opening from said common hall all of said hall doors for allowing access from inside said common hall to said plurality of holding means, each of said access means for opening, from inside only one of said plurality of holding means, said corridor door for allowing access to said corridor and said hall door for allowing access back to said common hall, said holding means for holding the unauthorized person attempting to enter any of said corridors through said holding means located at the entrance thereof with an access means that does not open said corridor door and said hall door from inside said holding means.

4,003,027
ARRANGEMENT FOR VARYING THE RATE OF RECORDING OF INFORMATION

Paul L. DiMatteo, Huntington, N.Y., assignor to Dynell Electronics Corporation, Melville, N.Y.

Filed Oct. 4, 1974, Ser. No. 512,081
Int. Cl.² G06F 5/06
U.S. Cl. 340—172.5 **17 Claims**



1. A method for changing the recording speed of a signal

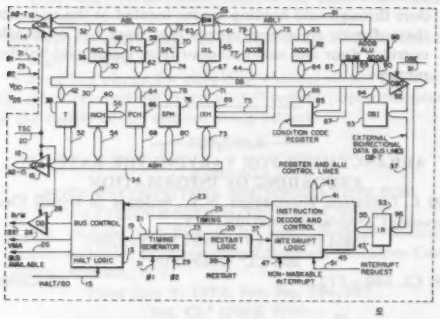
from a first speed to a second speed comprising the steps of: subdividing said signal into predetermined intervals by recording values of said signal at the ends of said intervals, said values corresponding to the oridnates of the signal when said signal is graphically represented on a system of coordinate axes; recording at a first speed the values of said signal at the ends of said intervals; sensing said recorded values at a speed substantially equal to said first speed; storing in a first storage means a first portion of said sensed values; storing in at least a second storage means a second portion of said values; recording at a second speed substantially different from said first speed the first portion of said values; stored in said first storage means; and alternately recording at said second speed the second stored portion of said values stored in said second storage means; said first and second portions of said values being stored and alternately recorded separately to allow said portions to be stored at said first speed prior to when said portions may be received and recorded at said second speed when said second speed is substantially different from said first speed, one of said stored portions being recorded at said second speed while the other one of said portions is being stored at said first speed.

4,003,028

INTERRUPT CIRCUITRY FOR MICROPROCESSOR CHIP

Thomas H. Bennett; Earl F. Carlow, both of Scottsdale, Ariz.; Charles Peddle, Norristown, Pa., and Michael F. Wiles, Phoenix, Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Oct. 30, 1974, Ser. No. 519,137
Int. Cl.² G06F *9/18, 9/20*
U.S. Cl. 340—172.5 **3 Claims**



1. In a microprocessor, circuitry for effecting execution of an interrupt operation of said microprocessor in response to an interrupt request signal, comprising:

data bus means for transferring digital information, said data bus means being coupled to a memory means having an interrupt routine program stored therein;

register storage means coupled to said data bus means for temporarily storing digital information in accordance with execution of various instructions by said microprocessor, including an instruction for setting an interrupt mask bit;

an interrupt request conductor for conducting said interrupt request signal;

instruction register means coupled to said data bus means for temporarily storing each instruction as it is received from said data bus means;

instruction decode means coupled to said instruction register means for controlling said register storage means and said data bus means to effect execution of the instruction stored in said instruction register means;

storage means coupled to said interrupt request conductor and said data bus means for storing said interrupt mask bit received from said data bus means in accordance with execution of said instruction for setting said interrupt mask bit;

gating means, coupled to said storage means and to said interrupt request conductor, for generating an interrupt enable signal responsive to said interrupt mask bit;

interrupt means, coupled to said gating means and to said data bus means, for inhibiting said temporary storing of the next instruction to be executed;

means responsive to said interrupt enable signal for internally generating a fixed code instruction within said instruction register means; and

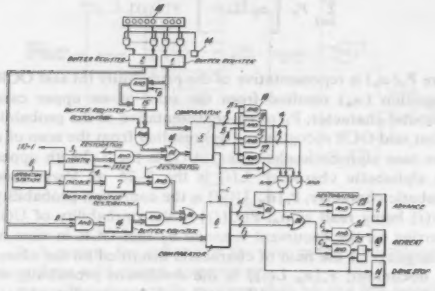
circuit means in said instruction decode means for effecting transferring digital information in said register storage means to said memory means and causing said microprocessor to branch to said interrupt routine program.

4,003,029

INFORMATION SEARCH SYSTEM

Masaaki Niiho, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 495,601, Aug. 9, 1974, which is a continuation of Ser. No. 312,148, Dec. 4, 1972. This application Dec. 18, 1974, Ser. No. 533,904
Int. Cl.² G06F *7/22*
U.S. Cl. 340—172.5 **3 Claims**



1. The method of operating a word data processing system for information searching comprising the steps of encoding each character of a word by assigning a character number representative of the particular character, and an order number representative of the position of each character in a word; storing the information so encoded in an information storage; sequentially entering into said system from an input word generator characters of a word to be searched; encoding each character to be searched as a first number representative of the character, and a second number representing the position of the character in the word to be searched; reading out the character and order number of a character at an output of said information storage; comparing the order number and character number of said output character with the respective first and second numbers of the character being searched; and driving said information storage to position the next adjacent word at said output until the second number is equal to the order number of the output character and the first number is equal to the character number of the output character, and repeating said comparing step for each such character comprising the word to be searched, said system comprising first and second comparator networks, and including the steps of feeding said order and second numbers to said first comparator network to produce first, second and third output signals when said order number is less than, greater than and equal to said second number respectively, driving said information storage in advance and reverse directions in response to said first and second signals respectively, feeding said character first number and third signal to said second comparator network to produce first, second and third output signals when said character number is less than, greater than or equal to said first number respectively, and driving said information

storage in response to said second comparator first, second and third output signals in an advance and reverse direction and stopping said information storage drive respectively.

4,003,030

ELECTRONIC CASH REGISTER

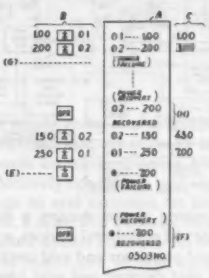
Haruo Takagi, Muko, and Reijiro Aoki, Nagaokakyo, both of Japan, assignors to Omron Tateisi Electronics Co., Japan

Filed Sept. 19, 1975, Ser. No. 614,778

Claims priority, application Japan, Sept. 25, 1974, 49-110299

Int. Cl.² G06F *1/00, 3/12, 13/00*

U.S. Cl. 340—172.5 36 Claims



2. An electronic cash register, comprising;

means for supplying electric power to said electronic cash register for energization thereof,

means operatively coupled to said power supply means for detecting recovery of the power supply after the occurrence of a power failure and producing a corresponding power recovery detected output signal,

means for entering information concerning commercial transactions to said electronic cash register,

storage means connected to said entering means for storing said entered information,

means responsive to said power recovery detected output signal from said power recovery detecting means for issuring a print enabling signal, and

means responsive to said print enabling signal for printing out said information stored in said storage means.

4,003,031

INFORMATION-ARRANGING DEVICE

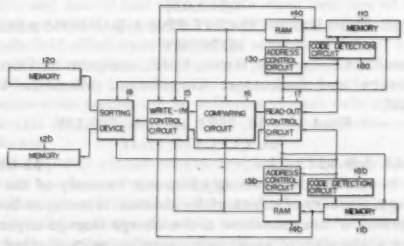
Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Jan. 23, 1975, Ser. No. 543,362

Claims priority, application Japan, Jan. 24, 1974, 49-10367

Int. Cl.² G06F *7/16, 7/36*

U.S. Cl. 340—172.5 6 Claims



1. An information-arranging device comprising:

two input memory means each for storing one group of records, each record comprising a plurality of words including at least one key word, said records being arranged serially with record positioning codes (BN) or different positioning codes (BK) interposed among them;

comparator means coupled to said input memory means for comparing the key words of any two records read out from said two input memory means, respectively, and generating a comparison output signal;

output memory means coupled to said input memory means and to said comparator means for storing, in response to a comparison output signal from said comparator means, one of the compared two records whose key word has priority and then the other record, together with a converted positioning code therebetween;

means for converting a record positioning code (BN) between any two records whose key words have been compared into a different positioning code (BK) before the records are stored in said output memory means;

positioning code-discriminating means coupled to said input memory means for determining whether a positioning code following each record read out from said input memory means is a record positioning code (BN) or a different positioning code (BK);

control circuit means coupled to said memory means, comparing means and positioning code-discriminating means for causing, when a record positioning code (BN) is detected by said positioning code-discriminating means, at least one record whose key word has been compared by said comparator means and has no priority to be stored in said output memory means after the record whose key word has been compared with that of said record and has priority, until a different positioning code (BK) is detected by said positioning code-discriminating means, and causing, when a different positioning code (BK) is detected by said positioning code-discriminating means, the keyword of a record following said different positioning code (BK) to be compared with the non-priority key word of said record, thereby storing in said output memory means one of the two records whose key word has priority upon receipt of a comparison output signal from said comparator means;

means for causing said comparator means to repeatedly compare the key words of two records at least one of which is different from the prior compared records; and

means coupled to said input memory means for transferring to said two input memory means the records stored in said output memory means when all of said stored records are stored in the output memory means in a sequential order determined by the key word comparison repeatedly effected by said comparator means.

4,003,032

AUTOMATIC TERMINAL AND LINE SPEED DETECTOR

Michael M. Austin, Salt Lake City, and William G. Barrett, Bountiful, both of Utah, assignors to Sperry Rand Corporation, New York, N.Y.

Filed June 9, 1975, Ser. No. 584,994

Int. Cl.² G06F *3/00, 3/04*

U.S. Cl. 340—172.5 19 Claims

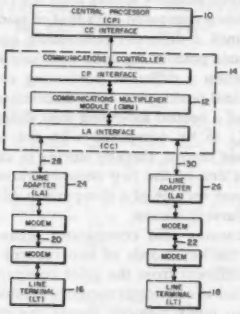
6. A detector for the automatic determination of the terminal characteristics and line speeds (ATLSD) of a plurality of line terminals that are to be demultiplexed from a plurality of communication lines, comprising:

demultiplexing means for receiving bit-serially from a selected one of a plurality of communication lines a plurality of first characters, each of which first characters is the first character that is to be transmitted by an associated one of a plurality of line terminals that are of to-be-determined terminal characteristics and line speeds, each of said first characters being a multibit word having a first Start bit signal transition and a last Stop bit signal transition, said Start bit and said Stop bit being separated by a plurality of intermediate Data bit signal transitions, the

signal transition that is formed by a predetermined one of said intermediate Data bits being designated by a count transition number (CTN) and the last signal transition of said first character being designated by a character transition number (KTN);

ATLSD Table means for storing a plurality of terminal identifier characters (TICs), each TIC comprising three bytes byte 1, byte 2 and byte 3, of which byte 1 includes the maximum sample count, i.e., the maximum number of sample counts that is required to count from the Start bit signal transition to the CTN of a particular Start character, and of which bytes 2 and 3 include the terminal characteristics and line speed of the line terminal that is associated with the maximum sample count of byte 1, each of said TICs being stored in an ascending order of maximum sample counts in an associated one of a plurality of ascendingly ordered addressable locations in said ATLSD Table means;

ATLSD register means coupled to said ATLSD Table means for storing the CTN and the KTN that are associated with all of the line terminals of a set of line terminals that is associated with the selected one of said communication lines and for storing the starting location address in said ATLSD Table means in which is stored the TIC having the minimum maximum sample count of the range of maximum sample counts that is associated with



all of the line terminals of said set of line terminals that is associated with said selected one of said communication lines;

transition detector means coupled to said demultiplexing means for detecting the first character signal transitions and then generating a transition signal upon the detection of each first character signal transition including said Start bit signal transition;

clocking signal generator means for generating a real-time clocking signal that is comprised of a plurality of relatively short duration clocking pulses having a frequency F;

sample counter means coupled to said clocking signal generator means and to said transition detector means for counting and accumulating the current sample count beginning with the signal transition generated by said Start bit;

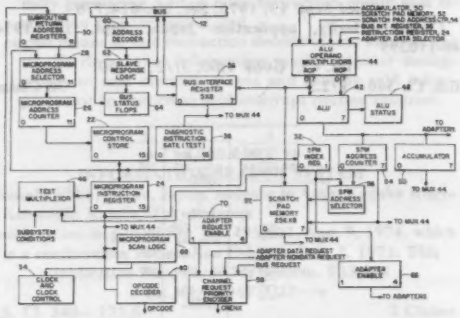
sample count comparator means coupled to said sample counter means and to said ATLSD Table means for comparing the current sample count that has been accumulated by said sample counter means to the current maximum sample count that is stored in the ATLSD Table addressable location that is currently being addressed and for incrementing the address of said addressable location when said current sample count equals said current maximum sample count.

4,003,033

ARCHITECTURE FOR A MICROPROGRAMMED DEVICE CONTROLLER

David B. O'Keefe, Tyngsboro; Frank V. Cassarino, Jr., Weston, and Douglas L. Riikonen, Westford, all of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Dec. 22, 1975, Ser. No. 643,439
Int. Cl.[2] G06F *3/00, 15/16*
U.S. Cl. 340—172.5 14 Claims



1. A data processing system having a data processor, a controller, a plurality of peripheral devices, a common electrical bus coupling said processor and said controller, a plurality of paths coupling said devices and said controller, whereby said controller is interposed between said bus and said devices, said controller coupled to control the operation of said devices, said controller comprising:

A. means for storing a plurality of instructions useable in controlling the operation of said controller;

B. a memory for storing information useable in the control and operation of said devices;

C. first means for addressing said means for storing;

D. second means for addressing said memory;

E. an instruction register for receiving the addressed one of said instructions from said means for storing;

F. an arithmetic unit having an input and an output;

G. means for coupling said output of said arithmetic unit to said means for addressing said memory;

H. multiplexor means for coupling said input of said arithmetic unit to either of the following means:

1. means responsive to said first means for addressing for receiving said instructions from said instruction register for controlling the operation of said controller,

2. means, responsive to said second means for addressing for receiving said information from said memory for controlling the operation of said devices, and

3. means for receiving information from said devices for enabling the control of said devices; and

I. means for coupling said multiplexor means with said memory for direct transfer of the information received by said multiplexor means to said memory for storage therein.

4,003,034

SENSE AMPLIFIER CIRCUIT FOR A RANDOM ACCESS MEMORY

Alexander C. Au, Los Gatos, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed May 23, 1975, Ser. No. 580,256
Int. Cl.[2] G11C *11/44*
U.S. Cl. 340—173 CA 11 Claims

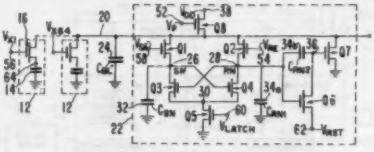
1. In combination with an electronic memory of the type having a plurality of substantially identical memory cells each comprised of one transistor and a charge storage capacitor, where a plurality of such memory cells are connected to a common bit line having an inherent bit line capacitance, an improved sense amplifier comprising:

a first and second transistor each having a gate electrode, a

drain and a source, said first gate electrode connected to said second drain, forming a reference node, said second gate electrode connected to said first drain forming a signal node;

a first control capacitance operatively connected between said signal node and ground;

a second control capacitance operatively connected between said reference node and ground, whereby the minimum input signal voltage required to cause said improved sense amplifier to read the binary state "1" is controlled by the magnitudes of said first and second capacitances;



charge sensitive means connected to said reference node for selectively rounding said common bit line; and,

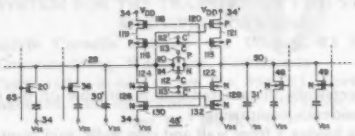
a third and fourth transistor forming bit line connection means for selectively connecting said signal node and said reference node to said common bit line, each having a gate electrode, a drain and a source, said third and fourth drains connected to said common bit line, said third and fourth sources connected to said signal node and said reference node, respectively, and said third and fourth gate electrodes being disposed for receiving control voltages.

4,003,035

COMPLEMENTARY FIELD EFFECT TRANSISTOR SENSE AMPLIFIER FOR ONE TRANSISTOR PER BIT RAM CELL

Charles Robert Hoffman, Tempe, and William Walter Lattin, Phoenix, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed July 3, 1975, Ser. No. 593,072
Int. Cl.² G11C 7/06, 11/24
U.S. Cl. 340—173 FF **14 Claims**



1. A semiconductor random access memory comprising:

a storage array including a plurality of storage cells;

a first sense-write conductor coupled to a plurality of said storage cells for receiving data from and transferring data into any one of said storage cells when said one of said storage cells is selected, all of said storage cells including only field effect transistors of the same conductivity type;

decode circuit means coupled to a plurality of said storage cells including one of said storage cells connected to said sense-write conductor for selecting storage cells coupled to said decode means by means of a first selection conductor;

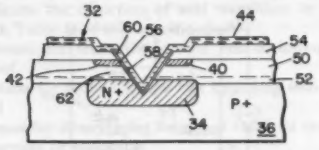
sense amplifier circuit means coupled to said first sense-write conductor for amplifying a sense signal imparted to said sense-write conductor by said selected storage cell and isolating said sense-write conductor so that it is electrically floating at times other than during a read operation or a write operation, and said sense amplifier circuit means including both P-channel and N-channel field effect transistors.

4,003,036

SINGLE IGFET MEMORY CELL WITH BURIED STORAGE ELEMENT

Fredrick Benjamin Jenne, Los Gatos, Calif., assignor to American Micro-Systems, Inc., Santa Clara, Calif.

Filed Oct. 23, 1975, Ser. No. 624,868
Int. Cl.² G11C 11/40
U.S. Cl. 340—173 R **17 Claims**



1. In a semiconductor memory device a single transistor cell comprising:

a substrate of low resistivity semiconductor material of a preselected polarity;

an epitaxial layer on said substrate having the same polarity as said substrate;

a first region of material buried within said substrate and having the opposite polarity therefrom;

a second region of material within said epitaxial layer having the same polarity as and spaced upwardly from said first region;

a gate means located within a recess on said device, said recess extending downwardly from its upper surface through said second region and into said first region, said gate means extending between said first and second regions; and

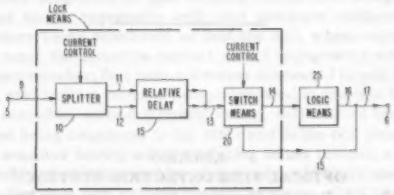
conductive contact means covering said gate means within said recess.

4,003,037

MAGNETIC BUBBLE DOMAIN PROCESSING APPARATUS AND METHOD

Hsu Chang, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 21, 1975, Ser. No. 570,326
Int. Cl.² G11C 11/14
U.S. Cl. 340—174 TF **31 Claims**



1. Control means for directing a data entity to one or another path depending on a key associated with said entity comprising.,

propagation means for propagating said key and data entity in serial order,

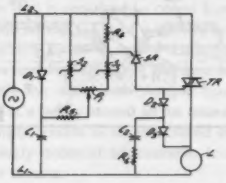
means for duplicating said key and for propagating, in serial order a first key, a second key and said data entity,

third means connected to said last named means and responsive to one of said keys for allowing said other key and said data entity only to propagate on said one path or said other path.

4,003,038
THERMAL DISCRIMINATOR FOR SENSING VARIATIONS IN THE HEAT EXCHANGE PROPERTIES OF A MEDIUM

Robert S. Meijer, Montreal, Canada, assignor to Multi-State Devices Ltd., Dorval, Canada

Filed June 9, 1975, Ser. No. 585,445
Int. Cl.² G08B 21/00
U.S. Cl. 340—227 D 8 Claims



1. A thermal discriminator for sensing variations in the heat exchange properties of a medium comprising:

a. a first and second switching devices having substantially indentical electrical characteristics and exhibiting regenerative switching at a power level which is dependent on the temperature sensed by said switching devices, both said switching devices being exposed to the same ambient temperature in a surrounding medium but only one of them being exposed to variations in the heat exchange properties of the surrounding medium;

b. means for applying to both switching devices sufficient power from an increasing voltage source to cause the switching devices to dissipate about the same amount of heat under certain conditions of the medium so that both switching devices would normally switch substantially simultaneously;

c. a coupling device interconnecting said first and second switching devices for inducing regenerative switching action in one of said switching devices in response to unbalance in the heat dissipated by said switching devices due to variations in the heat exchange properties of the surrounding medium from said conditions, and to inhibit the other switching device from switching; and

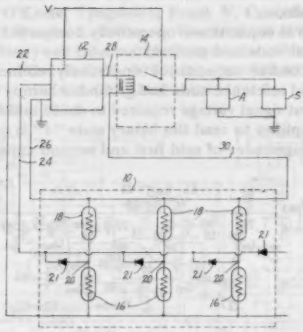
d. discriminating means connected to the first and second switching devices for detecting which one of said switching devices has switched as an indication that the heat exchange properties of the surrounding medium have changed.

4,003,039
OPTICAL FIRE DETECTION SYSTEM

Matthew J. Dunphy, Braintree, Mass., assignor to Pyrotector, Incorporated, Hingham, Mass.

Filed July 19, 1973, Ser. No. 380,849
Int. Cl.² G08B 21/00; G01N 21/58
U.S. Cl. 340—228 R 4 Claims

1. A condition sensing system which includes an amplifier and a remote condition sensing unit comprising a pair of impedence elements connected through a junction connected to the amplifier input across a voltage source, at least one of said impedence elements being responsive by a change in impedence to a condition to be detected, whereby a change in voltage occurs at the amplifier input, said amplifier being responsive to a predetermined change in voltage at the input to energize through a pair of circuit paths an actuating device,

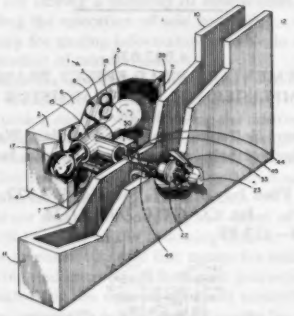


one of said circuit paths being by way of the full length of one of the power source leads to the condition sensing unit.

4,003,040
FLASHING ADDRESS-INDICATING DOOR SIGN

Cecil Carlton Browand, 5616 Reiter Ave., Las Vegas, Nev. 89108

Filed May 30, 1975, Ser. No. 582,287
Int. Cl.² G08B 5/00
U.S. Cl. 340—332 2 Claims



1. An electrically illuminated sign mountable on the exterior of a residence comprising:

a housing having a front wall and side walls, said front wall being at least partially transparent, indicia indicating the house number of a residence, said indicia being carried by the front wall such that the indicia are clearly outlined when the sign is illuminated,

white light means and red light means enclosed by said housing, flasher means for rapidly turning the red and white light means on and off, switch means mountable inside the residence having a first operating position, a second operating position, and a third operating position, a source of conventional AC power,

circuit means for operatively electrically connecting said power source to said white light means when the switch means is in the first operating position and operatively electrically connecting said power source to said white light means and the flasher means when the switch is in the second operating position, and for operatively electrically connecting said power source to said red light means and the flasher means when the switch is in the third operating position, and

mounting means for attaching the housing to the exterior of the residence.

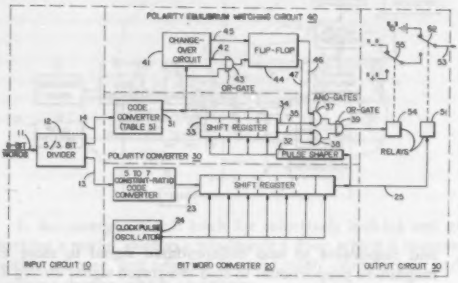
4,003,041
SYSTEM FOR CONVERTING BINARY SIGNALS INTO SHORTER BALANCED TERNARY CODE SIGNALS

Henrik Cornelis Anthony van Duuren, Zomerland-flat 330, Raaphorstlaan 25, Wassenaar, and Herman da Silva, Agrippinastraat 34, Voorburg, both of Netherlands

Continuation-in-part of Ser. No. 354,250, April 25, 1973, abandoned. This application Dec. 30, 1974, Ser. No. 537,399

Int. Cl.² H04L *3/00*

U.S. Cl. 340—347 DD **10 Claims**



1. A system for converting n-bit binary code signals of more than three bits per signal of 1 and 0 bits into a ternary balanced code signal of $n-1$ bits of 0, + and − bits per ternary code signal, wherein each ternary signal has the same number of 0-bits, comprising:

A. means for dividing each signal of said binary code into two groups of units, the first group consisting of the first $n-3$ bits of each code signal,

B. means for converting said first group of bits into the first $n-1$ bits having a constant ratio of 0 and 1-bits per signal,

C. means for converting the 1-bits of said first group of bits into + and − bits according to the second group of the last 3-bits of each binary code signal, and

D. means for inverting the + and − bits in alternate ternary code signals having the same unevenness in the number of + and − bits, so that after a few converted ternary signals any D.C. component in said ternary signals is eliminated.

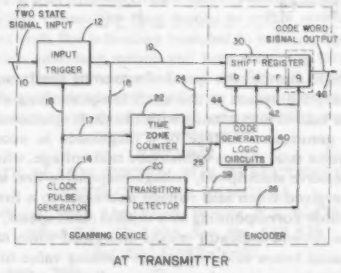
4,003,042
SYSTEM FOR THE TRANSFER OF TWO STATES BY MULTIPLE SCANNING

Hendrik Cornelis Anthony van Duuren, 83 Storm van's-Gravesandeweg, Wassenaar, Netherlands

Continuation-in-part of Ser. No. 354,251, April 25, 1973, abandoned. This application Jan. 29, 1975, Ser. No. 545,113

Int. Cl.² H03K *13/24*

U.S. Cl. 340—347 DD **8 Claims**



AT TRANSMITTER

1. An apparatus for the transfer of point of time and direction of a transition between two states of an input signal comprising:

A. means for continuously scanning said input in at least three successive equal time intervals (V) for determining the position time zone (0, 1, 2, 3) of said transition in a co-incident time interval,

B. means for generating binary bits for each time interval, comprising one bit repeatedly for one continuous state and the other bit repeatedly for the other continuous state,

C. means for generating a code word comprising less than five successive binary bits, two of which bits (b, a) indicate said position time zone, and the remaining bits (r, q) indicate the direction of said transition, in accordance with Table II of this specification

D. means for transmitting said bits including said code word,

E. means for receiving said bits including said code word, and

F. means for determining from said received code word the direction of transition.

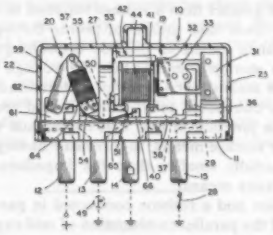
4,003,043
TIMED BUZZER

Arthur J. Little, Springfield, and William R. Mayer, Rochester, both of Ill., assignors to Stewart-Warner Corporation, Chicago, Ill.

Filed Jan. 26, 1976, Ser. No. 652,592

Int. Cl.² G01K *1/08*; **G08B** *3/00*

U.S. Cl. 340—403 **11 Claims**



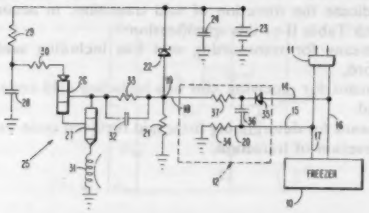
1. A timed buzzer, comprising; housing means, a coil assembly mounted in said housing means, an armature supporting member, a flexible armature connected to said armature supporting member, a contact carried by said armature, a contact member supported in said housing means and being positioned to be engageable with said armature contact, said armature being positioned so that the coil, when energized, will move the armature contact out of engagement with the contact member, first terminal means connected to said armature, said contact member being connected to one end of said coil assembly, second terminal means, said second terminal means being connected to the other end of the coil assembly, said armature having sound producing means thereon, a timer assembly mounted in said housing means, said timer assembly including first and second bimetal elements, third terminal means, one of said elements being connected to said third terminal means, one of said bimetal elements having heater means thereon, another of said elements being connected to said second terminal means, to provide a circuit to energize said coil assembly when said third terminal means is positive, fourth terminal means for grounding, said heater means being connected to both said third terminal means and said fourth terminal means so that the heater means heats the bimetal elements whenever said third terminal means is positive opening said bimetal elements after a predetermined time delay terminating operation of the sound producing means.

4,003,044

ALARM DEVICE HAVING AN OSCILLATOR

William O. Richmond, Jr., Lexington, Ky., assignor to Wolsk Associates, Ltd., Lexington, Ky.

Filed Sept. 30, 1974, Ser. No. 510,376
Int. Cl.² G08B 21/00
U.S. Cl. 340—253 C **19 Claims**



1. An oscillator circuit comprising:
charge storage means;
a source of power;
first impedance means connecting said source of power to said charge storage means;
second impedance means and third impedance means connected in series to opposite sides of said source of power, said second impedance means having a lower impedance than said third impedance means;
responsive means connected to said source of power through said second impedance means;
said responsive means being responsive to the voltage of said charge storage means reaching a predetermined voltage greater than a voltage supplied to said responsive means from said source of power through said second impedance means to provide a discharge path for said charge storage means when the voltage of said charge storage means reaches the predetermined voltage;
a resistor connected solely between said responsive means and the junction of said first impedance means and said charge storage means, said resistor having an impedance substantially smaller than the impedance of said first impedance means;
a capacitor and a resistor connected in parallel, one junction of the parallel combination of said capacitor and said resistor being connected to the junction of said second impedance means and said third impedance means and the other junction of the parallel combination of said capacitor and said resistor being connected to said responsive means;
and said source of power supplying a surge of current to a load when said responsive means provides the discharge path, said second impedance means having a substantially fixed voltage drop irrespective of the magnitude of current flowing therethrough to supply the surge of current from said source of power to the load when said responsive means provides the discharge path.

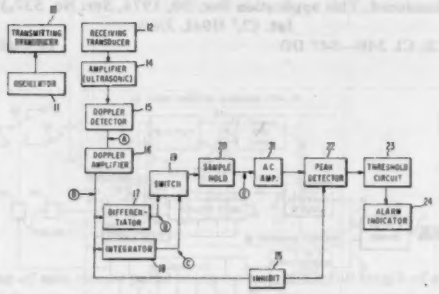
4,003,045

INTRUSION DETECTION SYSTEMS WITH TURBULENCE DISCRIMINATION

Roy Stockdale, Huntington, N.Y., assignor to Napco Security Systems, Inc., Copiague, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,692
Int. Cl.² G08B 13/18
U.S. Cl. 340—258 A **8 Claims**

1. An intrusion alarm system for detecting the presence of a moving target in the presence of interfering signals, comprising:
a. means for transmitting signals into a zone under surveillance,
b. means for receiving signals returned from said zone,
c. processing means operative in response to said received signals to provide an output signal, indicative of said moving target and said interfering signal,
d. first means for differentiating said output signal,
e. second means for integrating said output signal,
f. detector means coupled to said first and second means



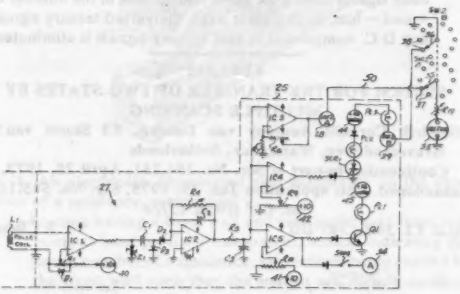
and responsive to said differentiated signal to store a magnitude proportional to said integrated signal during a predetermined period
g. threshold means coupled to said detector means and operative to provide an alarm signal when said stored magnitude is relatively constant during said predetermined period.

4,003,046

COTTON GIN MONITORING SYSTEM

Robert E. Jordan, Rte. 8, Box 1479, and Lloyd D. Miller, 4001 W. 28th, both of Pine Bluff, Ark. 71601

Filed Sept. 12, 1975, Ser. No. 612,629
Int. Cl.² G08B 21/00
U.S. Cl. 340—271 **20 Claims**

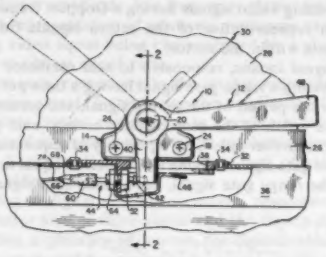


1. Means to monitor the speed of a rotating shaft comprising pulse generating means at the shaft for generating electrical pulses at a rate in accordance with the shaft rotational speed, means to generate a voltage of a magnitude in accordance with the pulse rate, means to measure said voltage, whereby to indicate relative shaft speed, voltage-responsive first indicator means energized when said voltage decreases to a first preset warning value corresponding to a critical shaft speed, voltage-responsive second indicator means energized when said voltage decreases below said first preset warning value to a lower second preset warning value corresponding to a bottom limit shaft speed, and means to turn off the second indicator means if the shaft speed subsequently rises above said bottom limit shaft speed but to hold the first indicator means energized if the shaft speed subsequently rises above said critical shaft speed.

4,003,047
EMERGENCY EXIT LATCH

Philip C. Johnson, South Bend, Ind., assignor to Revere Copper and Brass, Incorporated, New York, N.Y.

Filed Mar. 21, 1975, Ser. No. 560,737
Int. Cl.² G08B 13/08
U.S. Cl. 340—274 R 6 Claims



1. An emergency exit latch for selectively locking and unlocking a portal, such as a window or a door, which is mounted within a frame, and adapted for selectively operating an early warning device, which comprises:

a. a locking device comprising an elongated operator member configured to be gripped by an operator and tang means secured in angular relation thereto, said locking device being pivotally attached to said portal for rotation;

b. tang receiving means securely affixed to a frame portion adjacent said locking device when said portal is in a closed position comprising:

i. a base section defining an opening configured to selectively receive said tang means; and

ii. resilient locking means secured to said base section adjacent the opening thereof and positioned, dimensioned, and configured for selectively lockingly receiving at least a portion of the tang means when the locking device is rotated to a locking position, said resilient means engageably retaining said operator member and tang means in said locked position;

c. switch means mounted on the frame adjacent to said tang receiving means comprising an activating member having first and second positions, said first position providing a signal capable of deactivating said warning device and said second position providing a signal capable of activating the warning device, said switch means being positioned such that when the portal is in the closed position, rotation of the locking device to the locked position provides corresponding rotation of said tang means, and continued rotation produces engagement of said tang means with said activating member to change the position of said activating member to deactivate said warning device, and rotation of said locking device to an unlocked position causes the tang means to rotate out of engagement with the activating member to activate the warning device, said tang means and tang receiving means being respectively dimensioned and configured such that the warning device is activated prior to complete withdrawal of said tang means from said tang receiving means.

4,003,048
REMOTE ALARM SYSTEM FOR DETECTION OF FIRE EXTINGUISHER REMOVAL

George Weise, 1462 Alps Road, Wayne, N.J. 07470

Filed Feb. 23, 1976, Ser. No. 660,539
Int. Cl.² G08B 21/00
U.S. Cl. 340—280 6 Claims

1. A detection device and alarm system for the detection of the removal of a fire extinguisher from its usual location within a particular zone comprising in combination:

a plurality of break-away electrically conductive wire lanyard means interposed upon a supervisory circuit;

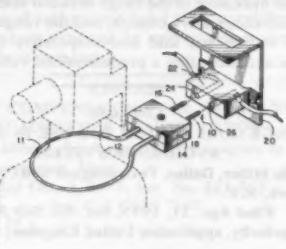
two male prong-female receptacle break-away connections to transfer supervisory current to said lanyard and a male prongfemale receptacle connection to output supervisory current from said lanyard to said supervisory circuit and the next detection device in series;

said female receptacle being stationarily secured;

an end-of-line supervisory circuit resistor to define said zones;

two batteries, one on either side of said resistor, connected in series to provice current for said supervisory circuit;

a sensitive relay connected to monitor each zone of said supervisory zoned circuit current to detect interruption of said zoned circuit;



a control alarm means having indicators corresponding to each of said supervisory circuit zones to indicate interruption of said supervisory circuit in a particular zone;

alarm circuit lines to correspond with and differentiate each zone of said supervisory circuit, connected to said alarm indicator means;

a latching relay to activate a particular alarm circuit;

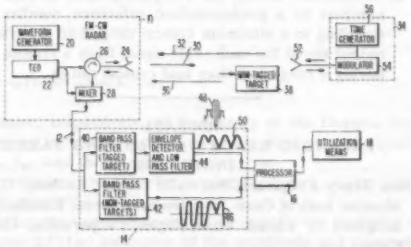
a power source to supply current to said alarm circuit through said latching relay upon interruption of a particular zone of said supervisory circuit; and

switch means activated by said sensitive relay upon interruption of said supervisory circuit to in turn activate said latching relay to supply power to an alarm circuit line corresponding with the interrupted supervisory circuit zone.

4,003,049
DUAL MODE AUTOMOBILE COLLISION AVOIDANCE RADAR

Fred Sterzer, Princeton, and Gerald Stanley Kaplan, Lawrenceville, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed July 3, 1975, Ser. No. 593,016
Int. Cl.² G01S 9/56, 9/46
U.S. Cl. 343—6 R 6 Claims



1. In a system for detecting the presence and range of a remote object from a probe station, said probe station transmitting modulating probe signals in a given direction, said object being of the class comprising cooperative targets hav-

ing means for receiving probe signals and radiating return signals having a characteristic indicia and non-cooperating targets serving to reflect said probe signals as return signals, said probe station comprising:

means for generating said modulated probe signals including means for generating a sample signal indicative of said probe signal;

means, receptive of said return signals and said sample signal, for generating a difference signal having distinguishable components indicative of return signals from said cooperative objects and of return signals from said non-cooperative objects; and

means, responsive to said difference signals, for generating a signal indicative of the range between said probe station and said cooperative objects, and the range between said probe station and said non-cooperative objects for all ranges not exceeding a predetermined value.

4,003,050

FULL RANGE CORRELATOR FOR USE IN A COLLISION AVOIDANCE SYSTEM

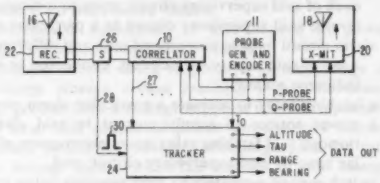
Jeffrey Ellis Miller, Dallas, Tex., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 21, 1975, Ser. No. 569,995

Claims priority, application United Kingdom, Apr. 23, 1974, 17707/74

Int. Cl.² G01S 9/56

U.S. Cl. 343—7.3 **6 Claims**



6. In a cooperative collision avoidance system employing two distinctive type probe signals transmitted from an interrogation station, including remote stations having means to respond to said probe signals and to generate reply signals corresponding to the type of probe signal received,

a. means responsive to said reply signals for generating a binary number representing the number of replies received during a predetermined period, said period corresponding to a range from said interrogation station to said remote stations,

b. storage means for storing a plurality of said binary numbers,

whereby the range of each reply received in response to a predetermined corresponding probe is stored in said storage means, and

c. comparator means for comparing each of said binary numbers to a predetermined reference number corresponding to a minimum critical range and generating an output signal for each reply signal from a remote station having a range less than said critical range.

4,003,051

EXPANDED RANGE GATE MOVING TARGET INDICATOR

John Henry Fitzgerald, Norwalk; Robert Anthony Guarino, Monroe, both of Conn., and Herbert Green, Elmsford, N.Y., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 17, 1975, Ser. No. 632,879

Int. Cl.² G01S 9/42

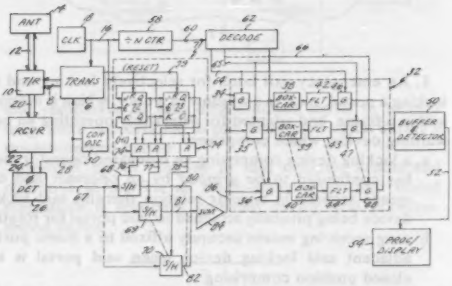
U.S. Cl. 343—7.7 **4 Claims**

1. A range gated moving target indicator radar system, comprising:

oscillator means for providing a timing signal;

signal means, including an antenna, a transmitter responsive to said oscillator means for providing to said antenna pulsed radar energy at a prescribed pulse width and pulse repetition period in dependence upon the timing signal for illuminating successive portions of a spatial sector, and a receiver for receiving, during a non-pulse portion of the pulse repetition period, return signals reflected from targets located within the spatial sector, said signal means providing video signals having a Doppler frequency spectrum representative of the return signals from moving targets within the sector;

gate signal means, responsive to said oscillator means for providing a range gate signal having a time period greater than the period of the timing signal, and greater than the pulse width of the pulsed radar energy, said gate signal means further providing a plurality of sequential, periodic video gate signals having a time period equal to the period of the range gate signal, each video gate signal time period including an enable portion having a time interval equal to the period of the timing signal;



video processing means, responsive to the video signals from said signal means and the video gate signals from said gate signal means, for expanding the signal width of the video signals to a value commensurate with the time period of the range gate signal; and

detection means, responsive to the expanded video signals from said video processing means, and including a plurality of range gated filters responsive to the range gate signal for quantizing the non-pulse portion of the pulse repetition period into a plurality of equal, contiguously sequential range intervals having a time duration equal to the range gate signal period, said plurality of range gated filters providing band-pass filtering of the expanded video signals coincident with each of the range intervals, said detection means providing a signal manifestation representative of moving targets detected within the spatial sector.

4,003,052

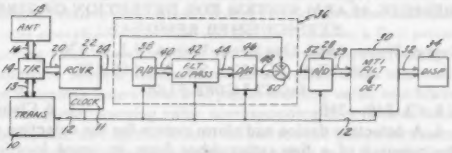
DIGITAL PREFILTER FOR CLUTTER ATTENUATION IN MTI RADARS

Stephen Adelman, Wilton, and Marshall Greenspan, Fairfield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 15, 1975, Ser. No. 641,127

Int. Cl.² G01S 9/42

U.S. Cl. 343—7.7 **9 Claims**



1. A digital moving target indicator radar system, comprising:

oscillator means for providing a timing signal;

signal means for providing pulsed radar energy for illuminating a spatial sector at a pulse repetition period in dependence on the timing signal and for receiving, during a non-pulse portion of the pulse repetition period, reflected radar energy from targets within the sector, said signal means providing in response thereto an analog video signal having a given amplitude, high frequency target signal component representative of moving targets and a larger amplitude, low frequency clutter signal component representative of relatively stationary targets, the analog video signal being characterized by a given value target-to-clutter signal ratio;

prefilter means, responsive to the analog video signal and the timing signal, for reducing the amplitude of the low frequency clutter component to provide a low clutter analog video signal with a target-to-clutter signal ratio which is substantially greater than that of said signal means video signal;

first analog-to-digital conversion means, responsive to the low clutter analog video signal and the timing signal for providing a plurality of low clutter digital video signals representative of the analog video signal amplitude coincident in a plurality of successive time intervals provided by the quantization of the pulse repetition period in dependence on the timing signal, said analog-to-digital conversion means having a resolution accuracy capable of providing amplitude discrimination between the target signal component and the reduced clutter signal component, the resolution accuracy being substantially less than that required to provide equal accuracy amplitude discrimination of the target signal component of said signal means video signal; and

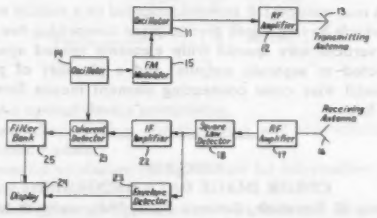
filter and detection means, responsive to said analog-to-digital conversion means, for filtering the low clutter digital signal to provide detection of the high frequency target signal component, and for providing in response thereto a signal manifestation representative of a moving target.

4,003,053

TARGET ADAPTIVE RADAR SYSTEM

Clare L. Mengel, McLean, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 16, 1966, Ser. No. 602,418
Int. Cl.² G01S 9/24
U.S. Cl. 343—14 **3 Claims**



1. A target adaptive frequency modulated radar system utilizing a target modulated signal produced by the combining interference of a coherent target reflected wave with a transmitted incident wave for reducing the effects of sea and ground clutter comprising:

means for transmitting a signal of given carrier frequency which is transmitter modulated plus and minus a given frequency value at a given rate for reflection from a coherent target, to produce a target modulated signal indicative of said coherent target by the combining interference of the transmitted incident signal with the reflected signal from said coherent target;

means for recovering said target modulated signal indicative of said coherent target, said recovered target modulated signal being comprised of said transmitter modulated given carrier frequency and frequency modulation produced by the combining of said incident signal with said reflected signal from said coherent target;

means for separating said given carrier frequency from said recovered target modulated signal;

a narrow band video amplifier connected to said means for separating said given carrier frequency from said recovered target modulated signal, for passing and amplifying only the remaining portion of said target modulation signal;

a coherent detector and an envelope detector connected to the output of said narrow band video amplifier; and

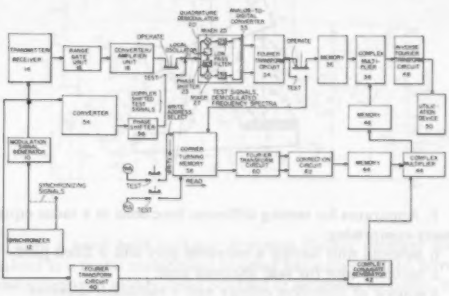
utilization means actuated by said coherent detector and said envelope detector.

4,003,054

METHOD OF COMPENSATING FOR IMBALANCES IN A QUADRATURE DEMODULATOR

Bertram J. Goldstone, Lexington, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Oct. 3, 1974, Ser. No. 511,553
Int. Cl.² G01S 7/40
U.S. Cl. 343—17.7 **1 Claim**



1. A method of correcting imbalances in amplification and in phase shift in the two channels of a quadrature demodulator in a radar receiver, such method comprising the steps of:

a. impressing a sinusoidal test signal analogous to a Doppler shifted echo signal from a moving target on the two channels of a quadrature demodulator of a radar receiver to derive a pair of time varying signals, $f_{1(t)}$ and $f_{2(t)}$;

b. converting each one of the time varying signals, $F_{1(t)}$ and $f_{2(t)}$, to a set of complex digital numbers;

c. determining, as a like set of complex digital numbers, the Fourier transform of the vector sum of the sets of complex digital numbers, such transform having two complex terms, $F(\omega)$ and $F(-\omega)$, where

$$F(\omega) = a(\omega) + j\, b(\omega)$$

and

$$F(-\omega) = a(-\omega) + j\, b\,(-\omega),$$

indicative, respectively, of the energy at the Doppler frequency, ω, of the vector sum of the time varying signals $f_{1(t)}$, $f_{2(t)}$ and the image frequency, $-\omega$;

d. determining the complex conjugate, $f(-\omega)$, of the complex term $F(-\omega)$;

e. adding the complex terms $F(\omega)$ and $F(-\omega)$ to derive a vector $2F1(\omega)$ indicative of the amplitude and phase of the first time varying signal $f_{1(t)}$;

f. subtracting the complex terms $F(\omega)$ and $F(-\omega)$ and multiplying the difference by the square root of minus one to derive a vector $2F2(\omega)$ indicative of the amplitude and phase of the second time varying signal, $f_{2(t)}$;

g. comparing the amplitudes of the vectors $2F1(\omega)$ and

$2F2(\omega)$ to derive a first correction factor indicative of the imbalance in amplitude between the time varying signals $f_{1(t)}$ and $f_{2(t)}$;

h. comparing the difference between 90° and the sum of the phase angles of the vectors $2F1(\omega)$ and $2F2(\omega)$ to derive a second correction factor indicative of the imbalance in phase between the time varying signals $f_{1(t)}$ and $f_{2(t)}$; and

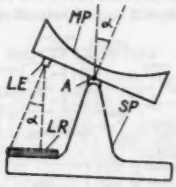
i. storing the first and second correction factor and applying such stored correction factors to the signals out of the quadrature demodulator during operation of the radar receiver.

4,003,055

RADAR FUNCTION TESTING APPARATUS

Nils Tage Eriksson, Molnlycke; Rune William Jacobsson, Goteborg, and Ingvar Georg Sundström, Molnlycke, all of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Oct. 20, 1975, Ser. No. 623,666
Claims priority, application Sweden, Nov. 6, 1974, 7413918
Int. Cl.² H01Q *3/02*; G01S *7/40*
U.S. Cl. 343—17.7 **7 Claims**



1. Apparatus for testing different functions in a radar equipment comprising:

n antenna unit having a movable part and a fixed part;

a receiver unit for said antenna unit;

a source of radiation energy and a radiation receiver;

means for providing a directed transmission of radiation energy between said parts of the antenna unit in dependence on the position of said movable part relative to the position of said fixed part;

means included in said radiation receiver for generating three different signals in dependence on the deviation of the direction of the radiant energy from a fictitious target direction corresponding to a certain target position, said signals consisting of a first signal whose amplitude varies with the received energy, a second signal which varies with the position of the radiation beam center relative to a symmetry axis, and a third signal which varies with the position of the beam center relative to another symmetry axis perpendicular to said symmetry axis;

a signal source for generating pulsed signals; and

attenuating means controlled by said first, second and third signals, for generating from said pulsed signals three different output signals which are fed to said receiver unit, said output signals corresponding to the target signals which would be obtained from a real radar target.

4,003,056

WINDSHIELD ANTENNA SYSTEM WITH RESONANT ELEMENT AND COOPERATING RESONANT CONDUCTIVE EDGE

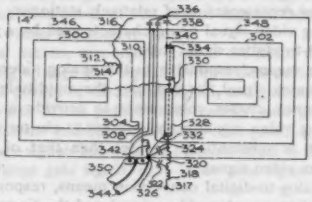
Ross Alan Davis, 724 Ala Moana Blvd., Honolulu, Hawaii 96813

Filed May 20, 1975, Ser. No. 579,149
Int. Cl.² H01Q *1/02*, *1/32*
U.S. Cl. 343—704 **18 Claims**

1. A conductive-body vehicle-antenna system responsive to both E-field and H-field electromagnetic signals, including:

an electrically conductive vehicle body having at least one window opening therein to form a conductive edge;

a plurality of intercoupled, electrically conductive members serially disposed on said window to form at least one loop having a total electrically effective length approximating one-half wavelength at an intended operating frequency of the system, said at least one loop being spaced from, but electrically coupled to



said edge, the end conductive member having a tuning end;

tuning means coupled to said tuning end for producing electrical resonance of said at least one loop in a predetermined range of frequencies;

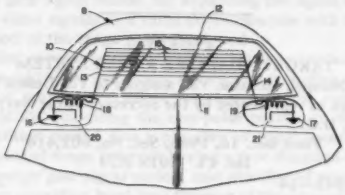
and, means for coupling to external circuits signals from said at least one loop.

4,003,057

REAR WINDOW DIRECTION FINDING ANTENNA

Arthur Luedtke, Marietta, and William F. Bentley, Jr., Smyrna, both of, GA, assignors to The United States of America as represented by the Field Operations Bureau of the Federal Communications Commision, Washington, D.C.

Filed Sept. 5, 1975, Ser. No. 610,708
Int. Cl.² H01Q *1/32*
U.S. Cl. 343—713 **8 Claims**



1. A rear window DF antenna mounted on a vehicle window of a vehicle having a split ground plane comprising two paralleled vertical wire spaced whip elements spaced apart and connected to separate outputs; and a plurality of parallel horizontal wire cross connecting element means forming a delay line.

4,003,058

COLOR IMAGE DATA RECORDER

Geoffrey S. Entwistle, Severna Park, Md., assignor to TRW Inc., Redondo Beach, Calif.

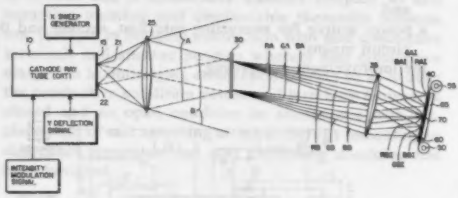
Filed Aug. 27, 1974, Ser. No. 500,990
Int. Cl.² G01D *15/14*
U.S. Cl. 346—1 **13 Claims**

1. The method of producing hard-copy color recordings representative of multi-dimensional data contained in an electrical signal, one of the dimensions of the data being represented spectrally, and at least one of the other dimensions being represented spatially, comprising the steps of:

displaying, on electronic light emitting means responsive to said electrical signal, a two-dimensional primary pattern of substantially white light units, the first dimension of said primary pattern representing the spatial dimension of at least a portion of said data, and the second dimension

of said primary pattern representing the spectral dimension of said portion;

spectrally decomposing the white light from said primary pattern into a secondary pattern of colored light, the chromatic content of said secondary pattern being primarily determined by the positions of said white light units in said second dimension;



generating, from said secondary pattern, a colored line representing the spatial and spectral data represented by at least part of said primary pattern; and

recording, on color-responsive photosensitive means, a color image recording of said colored line.

4,003,059

OPTICAL RECORDER HAVING FOCUS CONTROLLING MEANS

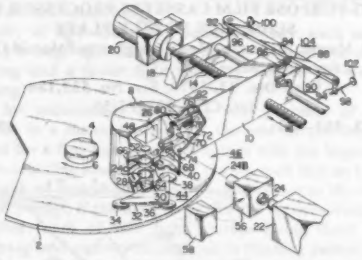
Yoshinori Sugiura; Kiyonobu Endo, both of Yokohama; Kimio Kono, Kawasaki, and Hideaki Sato, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 30, 1975, Ser. No. 545,746

Claims priority, application Japan, Feb. 7, 1974, 49-15735; Feb. 15, 1974, 49-18827

Int. Cl.² G01D *18/00*

U.S. Cl. 346—108 **14 Claims**



1. An optical device comprising:

a recording medium for recording and reproducing light beam signals;

means for producing the light beam for information recording and reproducing;

a floating member provided with at least one floating shoe having a surface adapted to face said recording medium, said floating shoe being floatable above said recording medium with a clearance determined by high pressure air produced adjacent said surface of the shoe;

an optical system for focusing the light beam on a surface of said recording medium, at least a part of said optical system being carried on said floating member and said optical system having at least three lenses, an optical path length between one of said at least three lenses and said recording medium being variable;

means for detecting the positional relationship of said floating member above said recording medium;

means for controlling, in accordance with said detecting means, said optical system to keep the focus of the light beam within a predetermined range relative to the surface of said recording medium, said controlling means changing the relative position of at least one of said at least three lenses relative to the surface of said recording medium.

4,003,060

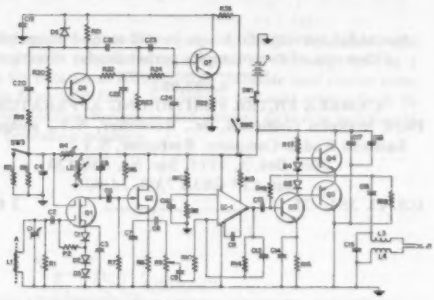
DIRECTION FINDING RECEIVER

Fred L. Broce, Doraville; William F. Bentley, Jr., Smyrna, and William L. Kilpatrick, Austell, all of Ga., assignors to The United States of America as represented by the Federal Communications Commission, Washington, D.C.

Filed Feb. 26, 1975, Ser. No. 553,313

Int. Cl.² G01S *5/02*

U.S. Cl. 343—113 PT **8 Claims**



1. In a hand held portable direction finding receiver contained in a metal rectangular housing having an affixed ferrite rod antenna in said housing coupled to receiving circuitry, the improvement in said receiving circuitry comprising a fixed and predesigned frequency tuned-input means and identically tuned-output means connected to a first dual gate protected MOS FET radio frequency amplifier having capability of operating at preselected rolloff points yielding a frequency bandwidth of at least 2% about said pre-designed frequency of said tuned-input, tuned-output means allowing simultaneous operation on more than one radio communication channel with no frequency tuning adjustments, said tuned-input means being connected to a first gate of said first FET, said tuned-output means connected to a drain of said first FET, and means for internally modulating a received signal connected to a second gate of said first FET.

4,003,061

PHOTOPLOTTER

Peter S. LaCanfora, Chelmsford, Mass., assignor to Applicon Incorporated, Burlington, Mass.

Filed Oct. 31, 1975, Ser. No. 627,675

Int. Cl.² G03B *41/00*

U.S. Cl. 354—4 **15 Claims**

1. A device for exposing selective portions of a photosensitive surface to produce a graphic display thereon, said device comprising;

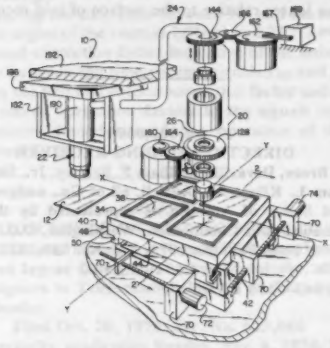
means for defining at least one aperture;

means for forming an image of said aperture in a first image plane;

a coherent fiber optic bundle for transmitting said image from said first image plane to a second image plane;

means for rotating one end of said coherent fiber optic

bundle so as to rotate said image in said second image plane; and



means for moving said image in said second image plane in either one of two mutually perpendicular directions.

4,003,062

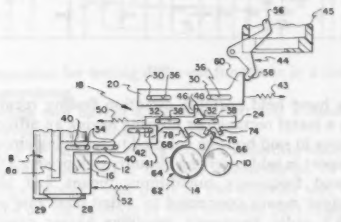
CAMERA FILTER POSITIONING APPARATUS

Floyd Malcolm Galbraith, Jr., Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 5, 1975, Ser. No. 638,128

Int. Cl.² G03B 7/00, 11/00

U.S. Cl. 354—21 **2 Claims**



1. In a camera adapted to selectively receive and expose film having different effective film speeds, under both ambient and flash illumination, said film being carried by means coded to indicate the speed of the film, said camera having a film-exposure path and means for removably mounting a flash unit thereon, the improvement comprising:

a filter selectively movable into and out of said exposure path;

means, responsive to the mounting of a flash unit on said camera, for urging said filter into said path; and

film speed code-sensing means, responsive to the presence of a relatively low-speed film in said camera, for rendering said filter urging means ineffective to move said filter into said path.

4,003,063

POWER SUPPLY REGULATOR FOR AN AUTOMATIC EXPOSURE ADJUSTING CIRCUIT FOR USE IN A CAMERA

Akira Takahashi, Tokyo, and Mikio Kobayashi, Kawasaki, both of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Sept. 6, 1974, Ser. No. 503,689

Claims priority, application Japan, Oct. 26, 1973, 48-119817

Int. Cl.² G03B 7/08

U.S. Cl. 354—50 **6 Claims**

1. In a camera having an automatic exposure adjusting system of the type comprising:

shutter means for operating in response to a trigger signal;

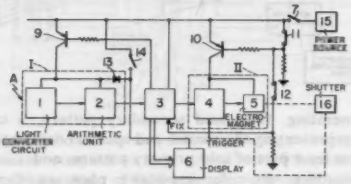
first circuit means for sensing incoming light and producing a photometry signal in response thereto;

second circuit means for storing said photometry signal until receipt of an end-of-photometry signal;

third circuit means for receiving said stored photometry signal upon receipt of said trigger signal and for producing an output signal in accordance with said stored photometry signal to end the operation of said shutter means; and

a power source for energizing said first, second and third circuit means;

the improvement comprising:



switching means connected between said power source and at least one of said first and third circuit means; and

means for controlling said switching means to cut off power from said power source to said at least one of said first and third circuit means in respective response to the occurrence of at least one of said end-of-photometry signal and the end of the operation of said shutter means; and wherein

said switching means comprises a transistor having its emitter connected to said power source, its base connected to said controlling means and its collector connected to one of said first and third circuit means.

4,003,064

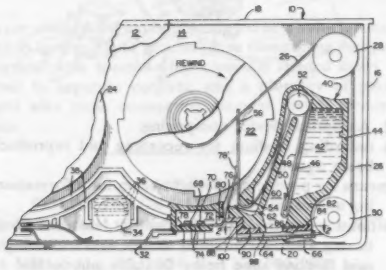
MULTI-PURPOSE FILM CASSETTE PROCESSOR HAVNG SLIDEABLE NOZZLE PLATE

Paul B. Mason, Magnolia, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 23, 1974, Ser. No. 535,184

Int. Cl.² G03B 17/50

U.S. Cl. 354—88 **29 Claims**



1. A photographic film cassette for use with other apparatus, said cassette configured for depositing a coating of processing fluid on a moving run of a cassette retained photographic film strip to develop images thereon, said cassette comprising:

a cassette housing;

means for cooperating with the other apparatus for advancing and guiding said film strip along a given path within said cassette housing;

means actuatable for depositing processing fluid on the advancing film strip; and

means for actuating said depositing means and for indicating to the other apparatus the processed condition of the film strip, said means for actuating and indicating including an actuating member mounted for displacement from an initial position wherein said depositing means is inoperative to another position wherein said depositing means is rendered operative, a pair of spaced apart conductive terminals, and a conductive element coupled to said actuating member and displaceable therewith between one position in bridging connection with said conductive terminals and another position wherein said conductive element is in unbridging connection thereto so as to alter the conductive condition across said terminals between a closed and an open condition in accordance with displacement of said actuating member thereby indicating to said other apparatus that said processing condition has been initiated.

4,003,065

FLASH DEVICE FOR A FOCAL PLANE SHUTTER CAMERA

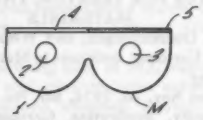
Kiyoshi Chikashige, c/o Asahi Kogaku-ryo, No. 33, 1-chome, Itabashi, Tokyo, Japan

Continuation of Ser. No. 469,439, May 13, 1974, abandoned. This application Oct. 17, 1975, Ser. No. 623,228

Claims priority, application Japan, May 30, 1973, 48-64339; Nov. 19, 1973, 48-133594

Int. Cl.² G03B *15/03*

U.S. Cl. 354—132 **11 Claims**



1. A flash device for use with a focal plane shutter camera, said flash device comprising:

a plurality of light sources of equal intensity, each source having a large light increasing rate in the early period of flashing and a lower light reducing rate in the end of flashing;

means for sequentially activating said plurality of light sources in a manner such that the end of the flashing period for a first light source overlaps with the beginning of a succeeding source with the timing such that an intensity peak of undesirable height would occur at the overlapped portion if the light output of the sources were not modified, each of said light sources being fixed with respect to said camera throughout its flashing period; and

means for sequentially and individually reducing the intensity of said succeeding light source throughout its flashing period to reduce said intensity peak of said overlapped portion.

4,003,066

MIRROR OPERATING ARRANGEMENT OF SINGLE LENS REFLEX CAMERA

Tetsuji Shono, Saitama, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

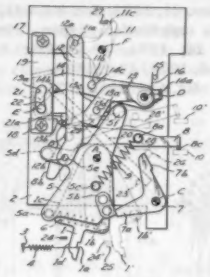
Filed Apr. 9, 1975, Ser. No. 566,204

Claims priority, application Japan, Apr. 13, 1974, 49-41871[U]

Int. Cl.² G03B *19/12*

U.S. Cl. 354—156 **8 Claims**

1. In combination, a mirror and a mirror mounting assembly for movably mounting said mirror in a single lens reflex camera with reduced shock loads upon movement of said mirror to a shutter operating position, said mirror mounting assembly comprising mounting lever means providing a generally horizontal, upwardly translatable mirror rotation axis for supporting said mirror adjacent an end of said mirror in a viewing position, said mirror being rotatable about said mirror rotation axis, in a first position of the axis, from said mirror viewing position to translate the free end of the mirror in an upward direction and thereby position the mirror at an angularly



displaced mirror-up position prior to shutter operation, said mounting lever means being adapted to be supported in a camera for rotational movement to translate said mirror rotation axis from said first axis position and said mirror from its mirror-up position further in said upward direction and to said shutter operating position.

4,003,067

AUTOMATIC PHOTOGRAPHIC SHUTTER CONTROL APPARATUS

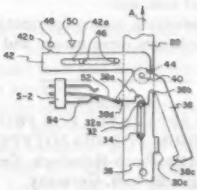
Gerhard Brauning, Stuttgart, Germany, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed June 3, 1975, Ser. No. 583,495

Claims priority, application Germany, June 6, 1974, 2427365

Int. Cl.² G03B *9/08*

U.S. Cl. 354—235 **7 Claims**



1. In a camera having exposure control apparatus utilizing an electronic timing circuit operably connected to an electromagnet to control drive means to move a shutter to initiate and terminate an exposure, the drive means being moved in a first direction by energization of the electromagnet to move the shutter to initiate an exposure and being moved by spring means to move the shutter to terminate the exposure upon de-energization of the electromagnet, the improvement comprising:

movable means, actuated by the drive means upon initial movement thereof to initiate an exposure interval, for de-energizing the electromagnet during a portion of the exposure interval and for holding the drive means to prevent movement of the shutter to terminate the exposure interval; and

means for momentarily re-energizing the electromagnet to move the drive means a second time in the first direction to release said movable means.

4,003,068
EXTENSION TUBE FOR USE IN CLOSE-UP PHOTOGRAPHY

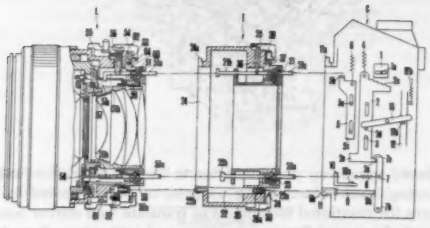
Shigeru Hashimoto, Yokohama, and Masaharu Ito, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 11, 1975, Ser. No. 631,129

Claims priority, application Japan, Nov. 26, 1974, 49-136525; Nov. 26, 1974, 49-136526; Nov. 26, 1974, 49-136527; Nov. 26, 1974, 49-136528

Int. Cl.² G03B *17/56*

U.S. Cl. 354—286 **6 Claims**



5. An intermediate barrel for use in close photography with a single lens reflex camera, said intermediate barrel being adapted to be insertable between the interchangeable lens mount and body of said camera, said body having automatic diaphragm control means and diaphragm drive means, and said interchangeable lens mount being provided with diaphragm means, diaphragm presetting means, manually operable means for said presetting means and means for selecting either automatic and manual diaphragm control mode, which intermediate barrel comprises;

a. position control means for securing said intermediate barrel to said camera body in predetermined angular spaced relation to each other,

b. fastening means rotatable on the outer peripheral surface of said intermediate barrel,

c. first interconnecting means for operatively interconnecting said automatic diaphragm control means and said diaphragm presetting means arranged to be rotatable about the optical axis; and

d. second interconnecting means for operatively interconnecting said diaphragm drive means and said diaphragm means.

4,003,069
METHOD AND APPARATUS FOR PRODUCING A DEVELOPER MEDIUM FOR DIAZOTYPE MATERIALS

Horst Hilgers, Bad Schwalbach-Heimbach, Germany, assignor to Hoechst Aktiengesellschaft, Germany

Filed Dec. 16, 1974, Ser. No. 533,191

Claims priority, application Germany, Dec. 21, 1973, 2363821

Int. Cl.² G03D *13/00*

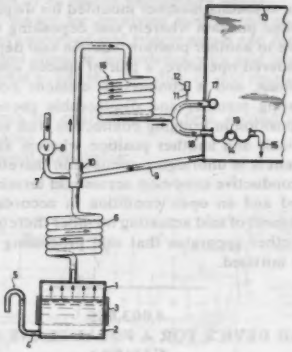
U.S. Cl. 354—299 **17 Claims**

1. An apparatus for producing a gaseous developer medium for a diazotype material from a developer solution, which apparatus comprises a vessel means, provided with a heater and an outlet for residual liquid, for generating a stream of vapor from a liquid,

conduit means in which a stream of developer solution flowing in one general direction can come into contact with a stream of vapor flowing in the other general direction, which conduit means communicates at one end with the vessel and is provided at, or in the vicinity of, the other end with an inlet for the developer solution,

condenser means which communicates with the end of the conduit remote from the vessel, the condenser means having an outlet for gaseous developer medium and an outlet for condensed developer medium,

and a vaporizing vessel means adapted to be located in a developing chamber for diazotype materials, which vaporizing vessel means communicates with the outlet for condensed developer medium.



4,003,070
APPARATUS FOR TREATING PHOTOGRAPHIC MATERIALS

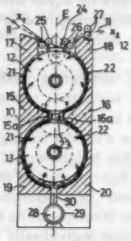
Werner Merz, Oberelchingen, and Werner Michaelis, Stuttgart, both of Germany, assignors to Merz & Co., Oberelchingen, Germany

Filed Nov. 20, 1974, Ser. No. 525,372

Claims priority, application Germany, Apr. 4, 1974, 2416393

Int. Cl.² G03D *3/08*, *3/02*

U.S. Cl. 354—322 **41 Claims**



1. An apparatus for treating photographic materials, especially for developing such materials, comprising housing means forming a chamber having an inner wall; at least one drum mounted in said chamber for rotation about an axis, said drum having a circumferential wall spaced from said inner wall so as to form a channel in which photographic material may be guided about said drum; aperture means in said circumferential wall communicating the interior of said drum with the exterior thereof; annular means concentrically mounted in the interior of said drum and having a diameter slightly smaller than the diameter of said drum so as to form with an inner wall surface of said circumferential wall a narrow annular clearance which communicates with said aperture means; and circulating means communicating with said clearance for circulating a treating fluid from said chamber through said aperture means into said clearance, to thereby create a suction which draws said material towards an outer surface of said circumferential wall to be conveyed during rotation of said drum.

4,003,071

METHOD OF MANUFACTURING AN INSULATED GATE FIELD EFFECT TRANSISTOR

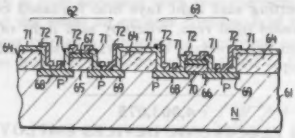
Sadaaki Takagi, Kawasaki, Japan, assignor to Fujitsu Ltd., Kawasaki, Japan

Continuation of Ser. No. 289,598, Sept. 18, 1972, abandoned. This application Mar. 3, 1975, Ser. No. 555,040

Claims priority, application Japan, Sept. 18, 1971, 46-72900; Dec. 27, 1971, 47-1824; Dec. 28, 1971, 47-3301; June 15, 1972, 47-59746

Int. Cl.² H01L *27/02*

U.S. Cl. 357—42 **3 Claims**



1. A semiconductor device comprising:

a semiconductor substrate of a first conductivity type having a main surface;

first, second and third regions of a second conductivity type, opposite to said first conductivity type, within said semiconductor substrate adjacent said main surface thereof and disposed with respect to each other to form a first channel within said semiconductor substrate between said first and second regions and a second channel within said semiconductor substrate between said second and third regions;

first and second insulating films of SiO_2 disposed upon said main surface of said semiconductor substrate overlying said first and second channels thereof, respectively, wherein said first and second insulating films each have a thickness of approximately 1500A and 1000 to 1200A, respectively;

a conductivity modifying impurity of said second conductivity type diffused into each of said first and second insulating films; and

said first insulating film being of a sufficiently large thickness such that said impurity of said second conductivity type diffused therein produces a field of a strength insufficient to change the conductivity type of said first channel whereby said first channel and said first and second regions form an enhancement mode transistor, and said second film being of a lesser thickness than said first film such that such impurity of said second conductivity type diffused therein produces a field of a sufficient intensity to alter the conductivity type of said second channel whereby said second channel and said second and third regions form a depletion mode transistor.

4,003,072

SEMICONDUCTOR DEVICE WITH HIGH VOLTAGE BREAKDOWN RESISTANCE

Takeshi Matsushita, Sagamihara, and Hisao Hayashi, Atsugi, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 351,172, April 17, 1973, abandoned. This application Nov. 1, 1974, Ser. No. 520,115

Claims priority, application Japan, Apr. 20, 1972, 47-39759

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² H01L *29/34*

U.S. Cl. 357—52 **12 Claims**

1. A semiconductor device comprising:

a planar substrate of semiconductor material of one conductivity type having first and second surfaces on opposite sides thereof;

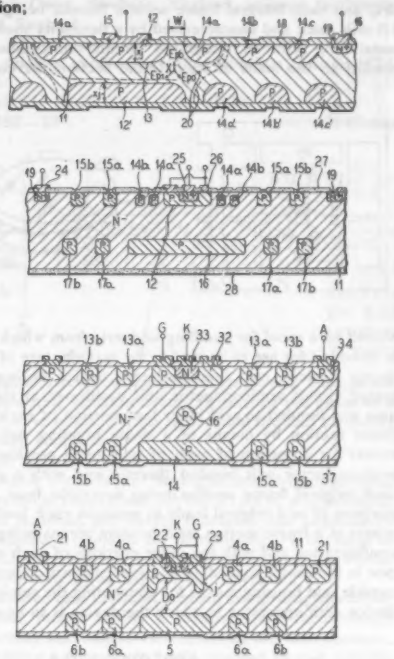
a first region of the opposite conductivity type on said first surface of said substrate forming a first pn junction therewith;

a first electrode mounted on said first region;

a second region of said opposite conductivity type on said first surface of said substrate forming a second pn junction therewith which surrounds said first pn junction in predetermined spaced relation;

a third region of said opposite conductivity type on the second surface of said substrate forming a third pn junction therewith which faces said first region in predetermined spaced relation therewith; the periphery of said third region extending beyond that of said first region;

said second and third regions being free of electrical connection;



a potential source reverse biasing said first pn junction with a potential of such magnitude such that the depletion layer will extend from said first pn junction to said second and third pn junctions;

a second electrode mounted on said substrate and disposed on a region of said one conductivity type on said first surface of said substrate, and the distance between said second electrode and said first region being larger than the distance between said first and second regions;

said potential source connected to said first and second electrodes;

said first, second and third regions being arranged so that a depletion layer extends from the vicinity of said first pn junction and surrounds said second and third regions so as to increase the breakdown voltage, and

insulating layers covering said first and second surfaces.

4,003,073

INTEGRATED CIRCUIT DEVICE EMPLOYING METAL FRAME MEANS WITH PREFORMED CONDUCTOR MEANS

Robert W. Helda, Hollywood, Fla., and Harry J. Geyer, Phoenix, Ariz., assignors to Motorola, Inc., Chicago, Ill.

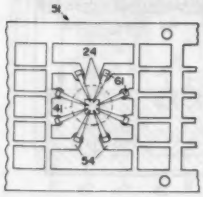
Division of Ser. No. 56,081, June 29, 1970, Pat. No. 3,698,974, which is a continuation of Ser. No. 691,040, Dec. 15, 1967, abandoned. This application Oct. 10, 1972, Ser. No. 296,186

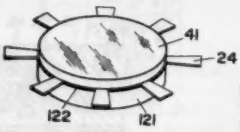
Int. Cl.² H01L *23/48, 23/28, 23/30*

U.S. Cl. 357—70 **2 Claims**

1. An integrated circuit semiconductor device adapted to be

produced with automated steps in the assembly thereof, said device including metal portions within housing means and extending outside said housing means for such device, said metal portions all having been originally a part of a substantially one piece flat metal strip including a plurality of lead frame sections in the strip and each lead frame section having a plurality of leads comprising said ultimate metal portions of the semiconductor device, each said metal portion in said device having an inner portion extending toward an originally open central area in the original frame section and an outer portion extending outwardly therefrom, said original metal strip and each integral frame section thereof being less than 4.0 mils thick and characterized by a flexibility such that the metal strip with an integrated circuit semiconductor unit bonded to the leads of each frame section thereof can be





wound on a spool for handling said strip from which said strip is unwound for use as needed in the manufacture of semiconductor devices, said semiconductor device having an integrated circuit semiconductor unit positioned at said central area and bonded to said inner lead portion of each lead in a frame section by means of a single bonding step, housing means for a portion of each of said metal portions and the semiconductor unit bonded thereto, and with a portion of each original frame section being severable from the outer portions of said original leads to separate each lead from the others in a frame section, said housing means being round in configuration and with the outer portions of each metal portion in the device extending in a spaced apart circular pattern outside said housing means for connecting the semiconductor device with apparatus in which the device is to be used.

4,003,074

HERMETICALLY-SEALED INJECTION SEMICONDUCTOR LASER DEVICE

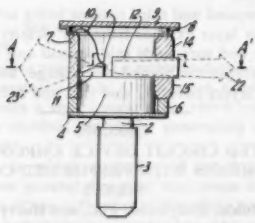
Hiroo Yonezu, and Izuo Hayashi, both of Tokyo, Japan, assignors to Nippon Selfoc Co., Ltd., Tokyo, Japan

Filed Oct. 29, 1974, Ser. No. 519,051

Claims priority, application Japan, Dec. 3, 1973, 48-139268[U]; Dec. 3, 1973, 48-139269[U]; Dec. 3, 1973, 48-139270[U]

Int. Cl.² H01L *23/02, 23/12, 33/00, 33/19*

U.S. Cl. 357—74 **5 Claims**



1. A hermetically sealed injection semiconductor laser device comprising:

a pair of metal electrodes;

a hollow generally cylindrical body of transparent insulating material having said pair of metal electrodes hermetically sealed to its ends and having one of said pair of metal electrodes protruding axially into its interior;

a semiconductor laser crystal pellet having an electrode surface thermally and electrically connected to the end of said protruding metal electrode with its light-emitting ends facing the wall of said hollow cylindrical body for emitting light rays in two opposite directions;

a flexible lead wire for electrically coupling another electrode surface of said pellet to the other of said pair of metal electrodes; and

a lens element at least partially disposed within said hollow cylindrical body and having its optical axis substantially perpendicular to the wall of said hollow cylindrical body, for converting said light rays into focussed or substantially parallel light rays, whereby said light rays are derived from two portions of the wall of said hollow cylindrical body.

4,003,075

GLASS ELECTRONIC DEVICES EMPLOYING ION-DOPED INSULATING GLASSY AMORPHOUS MATERIAL

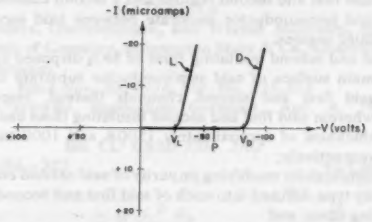
Seymour Merrin, Fairfield, Conn., assignor to Innotech Corporation, Norwalk, Conn.

Division of Ser. No. 227,932, Feb. 22, 1972, abandoned, and a continuation-in-part of Ser. No. 122,422, March 9, 1971.

This application Nov. 22, 1974, Ser. No. 526,166

Int. Cl.² H01L *45/00*

U.S. Cl. 357—2 **11 Claims**



1. A junction device having a current-voltage characteristic which is substantially nonconducting for voltages of a first polarity and substantially conducting for voltages of a second polarity, comprising:

a semiconductor substrate having one kind of conductivity; and

disposed thereupon a layer of a noncrystalline glassy amorphous material having the other kind of conductivity, said glassy amorphous material being an insulating material containing a sufficient concentration of ionic impurities to possess useful conductivity.

4,003,076

SINGLE BIPOLAR TRANSISTOR MEMORY CELL AND METHOD

Bohumil Polata, Los Altos, and James A. Marley, Jr., Saratoga, both of Calif., assignors to Signetics Corporation, Sunnyvale, Calif.

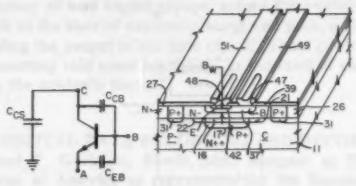
Continuation of Ser. No. 362,495, May 21, 1973, abandoned. This application May 5, 1975, Ser. No. 574,508

Int. Cl.² H01L *29/72*

U.S. Cl. 357—34 **5 Claims**

1. In a single bipolar transistor memory cell, a semiconductor body of one conductivity type forming a substrate and having a surface, an epitaxial layer of opposite conductivity type formed on said surface and providing a collector region and having a planar surface parallel to the surface of the semiconductor body, a buried layer of said one conductivity type extending into said semiconductor body from the surface of the semiconductor body, a base region of said one conduc-

tivity type formed in said epitaxial layer and extending downwardly from the surface of the epitaxial layer and being defined by a first generally dish-shaped PN junction extending to the surface of the epitaxial layer, an emitter region of opposite conductivity type formed in said base region and being defined by a second generally dish-shaped PN junction extending to the surface of the epitaxial layer, the collector to emitter connected reverse breakdown voltage of a given polarity being greater than the oppositely connected emitter to collector reverse breakdown voltage, a layer of insulating material overlying said surface of said epitaxial layer, and metallization on said surface and extending through said insulating material and making contact solely to said base and emitter regions so that the cell is only accessed with two contacts, one a base contact and the other an emitter contact, said bell having a collector-base parasitic capacitance identified as C_{CB} and an emitter-base parasitic capacitance identified as C_{EB}, said cell



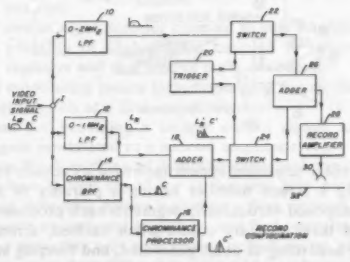
also having a collector-substrate capacitance identified as C_{CS}, means for applying a voltage between the base and emitter with respect to the substrate so that the voltage between the emitter and substrate is greater than that on the base to cause reverse breakdown from collector to emitter for charging of the capacitance C_{CS}, when the base is substantially fully depleted of mobile charges to a value given by the voltage applied between the emitter and substrate less the voltage drop across the depleted base, thereafter lowering the voltage applied between the emitter and base to approximately that of the base to cause the charge on the capacitance C_{CS} to be isolated from the emitter by the formation of a depletion layer at the collector-base junction, and thereafter applying a voltage between the base and emitter so that the voltage on the base is above that on the emitter causing forward collector to emitter current to remove the stored charge from the capacitance C_{CS}.

4,003,077

METHOD AND APPARATUS FOR CANCELLING CHROMINANCE ARTIFACTS

William Kelsey Hickok, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 25, 1976, Ser. No. 661,205
Int. Cl.² H04N *5/76, 7/12*
U.S. Cl. 358—4 **6 Claims**



1. In a color video recorder of the type employing an alternating line recording scheme wherein chrominance signal information residing on a color carrier and luminance signal information are extracted from a color television signal and are alternately recorded for transmitted lines of the color television signal, the improvement wherein:

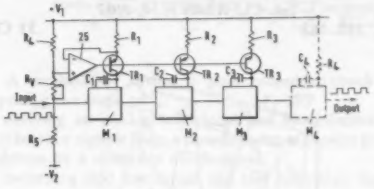
the color carrier on which the chrominance signal information resides is converted before recording to a frequency such that the color carrier of one line of the color television signal is substantially 90° out of phase relative to the color carrier of the preceding line.

4,003,078

SUB CARRIER PHASE SHIFTERS

David Peter Owen, Newbury, England, assignor to Quantel Limited, England

Filed June 3, 1975, Ser. No. 583,385
Claims priority, application United Kingdom, June 6, 1974, 25074/74
Int. Cl.² H04N *9/539, 5/22;* **H03K** *1/12, 5/13*
U.S. Cl. 358—22 **6 Claims**



1. In digital television equipment employing sub carrier waves, a smoothly variable circuit for shifting the phase of a sub carrier wave to achieve any shift within the shift capability of the circuit, comprising:

a variable source of phase-shift control voltage;

a monostable multivibrator having an input trigger terminal connected to receive said sub carrier wave, and having an output terminal, and having resistance and capacitance time constant elements for determining the duration of the astable state when the multivibrator is triggered from its stable state by an edge of said wave; and

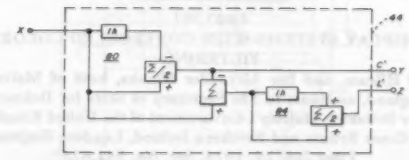
said resistance time constant element comprising electronic amplifier means having a resistive path therethrough comprising said resistance element of the time constant, and having a control electrode coupled to said variable source, whereby said control voltage controls the time constant of said multivibrator.

4,003,079

CHROMINANCE-LUMINANCE SIGNAL SEPARATION FOR OFF-AIR VIDEO RECORDER

Nea-Yea Woo, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 15, 1975, Ser. No. 605,095
Int. Cl.² H04N *9/535*
U.S. Cl. 358—31 **2 Claims**



1. Apparatus for processing interleaved chroma and luminance signals produced by line scanning a scene, the chroma being on a carrier that is an odd multiple of half the line scan rate, comprising:

a. means for producing a signal delay that corresponds with a multiple of the duration of a scan line;

b. first means for algebraically differencing a pair of signals;

c. means for applying the interleaved signals to said signal

delay means and to said means for algebraically differencing signals, the output of said delay means being applied to said means for algebraically differencing signals, the output of said first algebraic differencing means being said chroma signal;

d. second means for algebraically differencing signals, adapted to receive said interleaved signals and said chroma signal, the output of said second algebraic differencing means being said luminance signal; and

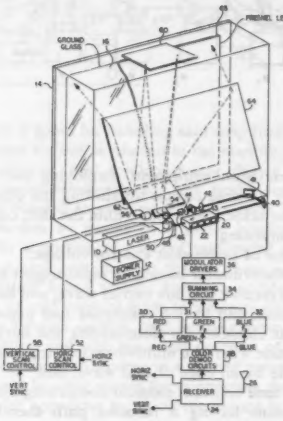
e. comb filter means adapted to receive and process said luminance signal.

4,003,080

LARGE SCREEN VIDEO DISPLAY SYSTEMS AND METHODS THEREFOR

Theodore H. Maiman, Marina del Rey, and Errol G. Payne, Irvine, both of Calif., assignors to Laser Video, Inc., Los Angeles, Calif.

Filed June 2, 1975, Ser. No. 582,653
Int. Cl.² H04N 9/14, 3/02
U.S. Cl. 358—63 **31 Claims**



11. A compact system for producing a high contrast large area visual display from a modulated laser beam comprising:

scanning means for scanning the modulated laser beam through a display raster;

optical path folding means disposed in the path of the scanning beam for providing a relatively long optical path for the beam within a confined volume; and

areal display means adjacent the confined volume and substantially coextensive therewith for projecting the image defined by the display raster, the display means being disposed in the path of the focused beam adjacent the optical path folding means, said display including optical gain means.

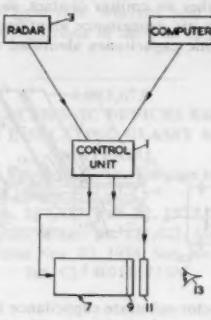
4,003,081

DISPLAY SYSTEMS WITH CONTROLLED COLOR FILTERING

Cyril Hilsum, and Ian Alexander Shanks, both of Malvern, England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Jan. 20, 1975, Ser. No. 542,625
Claims priority, application United Kingdom, Jan. 21, 1974, 2764/74
Int. Cl.² H04N 9/16
U.S. Cl. 358—64 **6 Claims**

1. A color television display system including a light emitting screen capable of being energized to emit light in the form of a visual image in three colors E1, E2 and E3 of the visible spectrum, means for applying different kinds of input signal to energize said screen, said input signals being video signals representing colors, an electrically controllable filter located in front of said screen, said filter comprising in combination a polarizer, an analyzer and a liquid crystal layer having an electrically adjustable optical activity whereby electrical variation of the optical activity changes the color passed by said analyzer, said filter being capable of separately passing at least two of the colors emitted by the screen, an electrode structure for applying an electric field across said layer, and means for controlling said electric field to change the optical activity of said liquid crystal layer whereby light emitted by said screen is passed in different colors one color at a time by said filter, the passed color being selected to correspond to the input signal applied to energize said screen, said system additionally com-



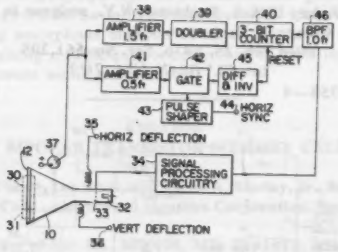
prising a further liquid crystal filter located in front of said screen, said first mentioned filter having a first state which passes only color E1 and a second state which prohibits color E1 from passing, and said further filter having a first state which passes only color E3 and a second state which prohibits color E3 from passing, at least one of said second states passing color E2.

4,003,082

COLOR TELEVISION SYSTEM EMPLOYING INDEX SIGNAL GENERATING MEANS

Teruo Fumoto, Kawasaki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed May 13, 1975, Ser. No. 577,077
Claims priority, application Japan, May 15, 1974, 49-54754
Int. Cl.² H04N 9/24
U.S. Cl. 358—69 **6 Claims**



1. In a color television system including a cathode ray tube comprising a screen member having a plurality of parallel laterally disposed vertical strip segments each producing light of one of three primary colors when excited, arranged in sequence according to color generated, and forming substantially identical triplet groups occurring at a predetermined rate along substantially horizontal paths of excitation traversing said segments; and means providing a cathode-ray beam for scanning said screen member and sequentially exciting said groups of segments along said paths, said screen member

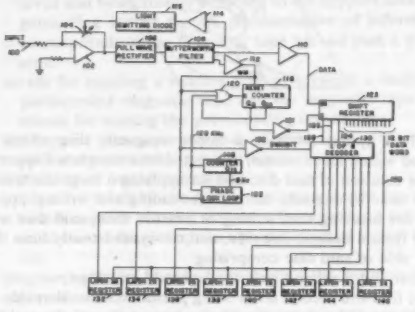
being provided with a plurality of first index strip elements arranged parallel with said strip segments for sequential excitation by said beam concurrent with the excitation of said triplet groups; said screen member being provided with a plurality of second index strip elements occurring at a predetermined rate along said paths preceding said first elements for sequential excitation by said beam before excitation of said first elements, the rate of said second elements along said paths being different from the rate of said first elements along said paths; first bandpass filter means tuned to the frequency of, and receptive of, the signal from said first elements for filtering the same; second bandpass filter means tuned to the frequency of, and receptive of, the signal from said second elements for filtering the same, and a gate circuit coupled to the second bandpass filter means for gating the output signal from said second bandpass filter means, the improvement comprising: counting means coupled to said first filter means for converting the frequency of the signal therefrom to the frequency of said triplet groups; means for enabling the gate circuit at the start of each scan along said path, and means for coupling the output of the gate circuit to said counting means for resetting said counting means at the start of each scan to erase the contents thereof.

4,003,083

DIGITAL DATA RECORDING AND DECODING

Michael C. Gariazzo, Bowie, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 15, 1975, Ser. No. 568,235
Int. Cl.² G11B *5/06*
U.S. Cl. 360—29 **6 Claims**



1. A system for multiplexing signals representative of digital data words for recording and thence their decoding, comprising:

shift register means for converting said data signals from parallel to serial form;

means for multiplexing and modulating said data signals for recording, said multiplexing means including:

a counter;

a one of eight decoder coupled to said counter; and

a plurality of analog gates coupled to respective shift registers and said one of eight decoders;

said modulating means including means for modulating said data signals at a first amplitude A_2;

means for providing a unique output signal, said output signal modulated at a second amplitude A_1;

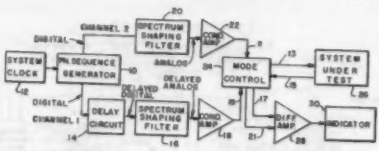
means for detecting and demultiplexing said signals and said unique output signal for conversion into parallel form, said detecting means including a first, second, third and fourth operational amplifier, said first operational amplifier detecting only said unique output signal, said second operational amplifier detecting said signals representative of the data, said third operational amplifier enabling the control of the gain of said fourth operational amplifier whereby the gain of said fourth operational amplifier is adjusted to compensate for amplitude variations in the recording medium.

4,003,084

METHOD OF AND MEANS FOR TESTING A TAPE RECORD/PLAYBACK SYSTEM

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Gabriel R. Wallace, Palm Bay, Fla.; William E. Salter, Palm Bay, Fla.; Glenn D. Weathers, Palm Bay, Fla., and Sidney S. Gussow, Palm Bay, Fla.

Division of Ser. No. 419,831, Nov. 28, 1973, Pat. No. 3,875,500. This application Mar. 25, 1975, Ser. No. 561,956
Int. Cl.² G11B *27/36*
U.S. Cl. 360—31 **14 Claims**



1. A method for testing a tape record/playback system comprising the steps of:

a. deriving an analog test signal and band-limited digital reference signals from a pseudo-noise sequence generator driven by a reference clock signal;

b. recording said test signal and said reference signals on respective tracks of the system during operation thereof in a record mode;

c. playing back the recorded signals during the playback mode of operation of the system;

d. reconstructing a delayed analog reference signal without time base variations from the played back reference signals; and

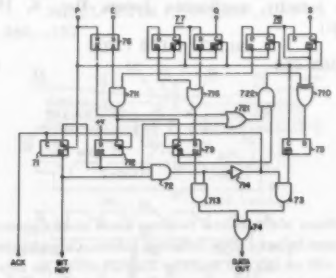
e. comparing the played back test signal with the reconstructed analog reference signal to obtain an error signal that is a measure of the performance of the tape record/-playback system.

4,003,085

SELF-CLOCKING, ERROR CORRECTING LOW BANDWIDTH DIGITAL RECORDING SYSTEM

Chin Tao Wu, Hightstown, N.J., assignor to RCA Corporation, New York, N.Y.

Division of Ser. No. 485,520, July 3, 1974. This application July 31, 1975, Ser. No. 600,598
Int. Cl.² G11B *5/02*
U.S. Cl. 360—40 **7 Claims**



1. In a system for sensing a record medium having at least two possible recording states, the combination comprising:

sensing means for producing a read signal in response to a change of state on said record medium; and

data decoding means responsive to said read signal for detecting a cell boundary when two read signals occur within an interval not greater than one-half the time between cell boundaries and for producing data output

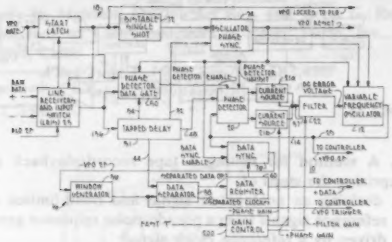
signals when a single read signal occurs within cell boundaries.

4,003,086

DYNAMIC LOOP GAIN ALTERATION FOR DATA RETRIEVAL

Tore Langemyr Larsen, and Kenneth Holly, both of San Jose, Calif., assignors to Memorex Corporation, Santa Clara, Calif.

Filed Apr. 28, 1975, Ser. No. 572,518
Int. Cl.² G11B *5/09*
U.S. Cl. 360—53 **4 Claims**



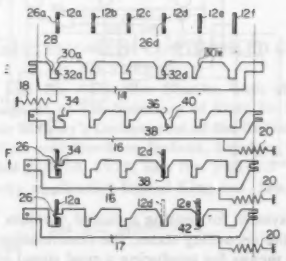
1. A data recovery system comprising:
a. at least one rotating magnetic disc;
b. means for positioning a magnetic transducer head adjacent a desired track on said disc;
c. means for reading data recorded thereon, said means including a variable frequency oscillator and a variable frequency oscillator feedback control loop; and
d. means for attempting to recover recorded data after a predetermined number of unsuccessful retry attempts to read data comprising means for increasing the variable frequency oscillator loop gain for up to a predetermined number of retries, whereby the variable frequency oscillator has decreased response time and increased bandwidth to thereby read marginally recorded data.

4,003,087

MECHANISM FOR USE IN MAGNETIC TAPE RECORDER/PLAYER

Mitsuaki Iwasaki, and Hidehiro Kobayashi, both of Yokohama, Japan, assignors to Victor Company of Japan, Limited, Japan

Filed Dec. 2, 1974, Ser. No. 528,789
Claims priority, application Japan, Dec. 4, 1973, 48-138312[U]
Int. Cl.² G11B *15/04*
U.S. Cl. 360—60 **6 Claims**



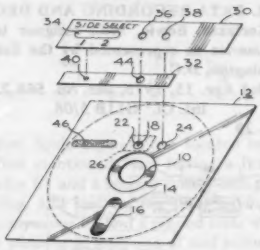
4. A mechanism for use in a magnetic tape recorder/player including a first key for actuating a recording-reproducing mode change switch, a second key for actuating a muting switch and a third key for stopping record operation of the recorder-player, said mechanism comprising:
a first locking plate yieldingly urged to a locking position wherein said first and second keys can be locked in their depressed positions when they are depressed, said first locking plate having a surface engaging with said third key such that upon depression of said third key, said first locking plate shifts to an unlocking position wherein said first and second keys are released; and
second locking plate yieldingly urged to a locking position wherein said first key can be further locked in the depressed position thereof when said second key is depressed, said second locking plate having a surface engaging with said second key such as to be held in said locking position thereof as long as said second key is depressed.

4,003,088

LOCK OUT TAB FOR MAGNETIC DISC ENVELOPE

Vern Schwartz, Sunnyvale, Calif., assignor to Information Terminals Corporation, Sunnyvale, Calif.

Filed Oct. 8, 1975, Ser. No. 620,656
Int. Cl.² G11B *15/04*, *23/04*
U.S. Cl. 360—60 **4 Claims**



1. In a system wherein a floppy magnetic disc which is rotated within an envelope, is inserted into associated apparatus for rotation of said disc and for applying a magnetic transducer head to one side thereof for reading and writing, apparatus for insuring that writing or erasure from said disc will occur from a desired one side, and not inadvertently from the other side of said disc comprising
a first and a second hole through said envelope,
said first and second holes being positioned on either side of a center line through said envelope, and radially equidistant from the center of said envelope and disc,
a third hole through said disc positioned to be aligned successively with said first and second holes once each revolution of said disc,
a light source positioned within said associated apparatus for directing light through said first hole when said disc and envelope are operatively inserted within said apparatus with one side adjacent to said transducer, and for directing light through said second hole when said disc and envelope are inserted within said apparatus with the other side adjacent to said transducer,
photocell means positioned opposite said light source for receiving light from said light source through said first hole when said disc is operatively inserted within said apparatus with said one side adjacent said transducer and for receiving light from said light source through said second hole, when said disc is operatively inserted within said apparatus with said other side adjacent said transducer,
moveable means, moveable for selectively covering said first hole and permitting light from said light source to pass through said second hole, or for covering said second hole and permitting light to pass from said light source through said first hole, and
means responsive to the output of said photocell means

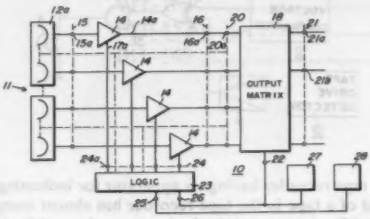
when it is actuated, for enabling said transducer means to function.

4,003,089

ELECTRONIC CHANNEL SELECTING SYSTEM FOR A QUAD-STEREO TAPE PLAYER

Louis Clifford Maurer, Woodridge, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 31, 1974, Ser. No. 537,743
Int. Cl.² G11B 15/12
U.S. Cl. 360—63 18 Claims



1. A magnetic tape playing device for playing a selected one of two or more analog programs on a prerecorded multitrack tape, each program comprised of two or more predeterminedly located tracks on the tape comprising

support means,

a magnetic tape head means having a plurality of pickup areas and being fixedly mounted to the support means for generating output signals representative of information prerecorded on the magnetic tape moved past a pickup area,

means for creating a relative motion between a multitrack prerecorded magnetic tape and the magnetic tape head means for sensing the prerecording on the tape,

the support means permanently aligning each pickup area with a separate track on the tape,

a plurality of output terminals,

a plurality of fully electronic switches, each electronic switch capable of being activated for coupling a predetermied one of the pickups to a predetermined output terminal,

program selecting means for selecting the program to be played, and

control means for automatically determining the number of tracks which comprise a program on the particular tape being played and responding to the program selecting means to activate only those electronic switches which couple a desred pickup to a desired output.

4,003,090

MAGNETIC RECORDING AND REPRODUCING SYSTEM WITH TAPE-TO-HEAD SPEED CONTROL

John Brewer Beck, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Jan. 29, 1975, Ser. No. 545,155
Claims priority, application United Kingdom, Feb. 18, 1974, 7257/74; Feb. 18, 1974, 7254/74; Feb. 18, 1974, 7256/74
Int. Cl.² H04N 5/78; G11B 15/54, 27/10
U.S. Cl. 360—70 7 Claims

1. In a magnetic recording and reproducing system in which magnetic recording and reproducing head means are mounted on a wheel driven by rotational driving means for recording and reproducing signals on a transported magnetic tape in successive tracks that are skewed relative to the lengthwise direction of the tape, a control system comprising:

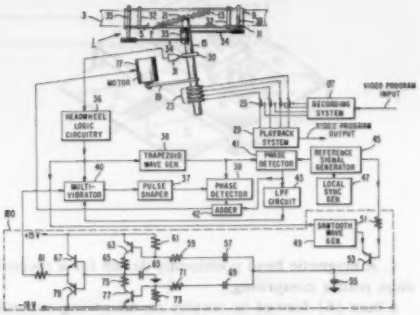
means for producing a substantially square wave having a period determined by the rate of rotation of said wheel for providing a repetitive control signal during each cycle of rotation of said wheel at a rate corresponding to said rate of rotation of said wheel;

monostable multivibrator means for generating a pulse signal in a predetermined time relationship with respect to one edge of said square wave for supplying first controllable reference signals having a repetition rate representative of a desired velocity of said wheel;

a first control means responsive to said control signal and said first reference signals for providing a first velocity error signal;

means for providing second reference signals having a substantially fixed repetition rate;

a second control means responsive to said control signal and



to said second reference signals for providing a second error signal indicative of relatively slowly varying deviations in the position of said head means from a predetermined positional relation with respect to said tape;

a third control means responsive to said control signal and to said second reference signals for providing a third error signal in response to errors in velocity of said wheel greater than a predetermined threshold;

means coupling said third error signal to said monostable multivibrator means for varying said predetermined time relationship; and

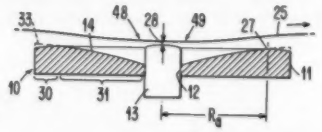
means for coupling said first, second and third error signals to said driving means so as to maintain synchronization of said head means with said tracks.

4,003,091

TRANSDUCER SUPPORT AND STABILIZER

Gary Thorup Wright, Longmont, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 8, 1976, Ser. No. 665,153
Int. Cl.² G11B 15/64, 5/60, 5/82
U.S. Cl. 360—102 12 Claims



1. A combination head support and flexible medium stabilizer comprizing a toroidal member with a radial inner surface portion and an outer surface portion coaxial to the axial axis of said toroid and having a circular convex-shaped medium-facing surface portion with an annular apex being an outward-most line of said convex surface located not less than one-half of the difference between the radii of said outer and inner surfaces; and

means disposed at said inner radial portion and extending thereacross for substantially blocking air flow along said axial axis.

4,003,092

READING OR WRITING HEAD POSITIONING DEVICE

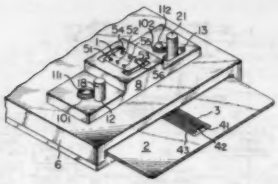
Osamu Hirata, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 8, 1974, Ser. No. 522,291

Claims priority, application Japan, Nov. 15, 1973, 48-132640[U]

Int. Cl.[2] G11B *74/55, 360/129*

U.S. Cl. 360—109 9 Claims



1. A magnetic head positioning device for a recording medium reader comprising:

a base (6) formed to receive an advancing recording medium;

a holding member (8) mounted on said base for holding a magnetic head;

a magnetic head (1) held by said holding member in a predetermined relationship to a path along which a recording medium may be advanced;

first eccentric means (13, 21) rotatably mounted on said base and contacting said holding member to adjust the angle of said head relatively to the direction of advance of the recording medium; and

second eccentric means (12, 18) including a member rotatably mounted on said base and contacting said holding member for moving said head in a direction transverse to the direction of movement of the recording medium, movement of said second eccentric means being limited in its ability to move said head by said first eccentric means.

4,003,093

APPARATUS FOR INDICATING TAPE END IN A TAPE RECORDER AND BATTERY LEVEL

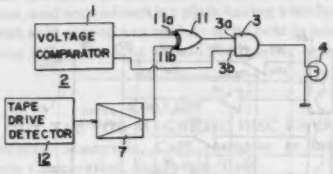
Ken Satoh, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 27, 1975, Ser. No. 580,778

Claims priority, application Japan, June 11, 1974, 49-67868[U]; June 13, 1974, 49-68936[U]

Int. Cl.[2] G11B *15/00;* G08B *21/00, 19/00;* G03B *1/60*

U.S. Cl. 360—137 7 Claims



1. A tape recorder having an apparatus for indicating when one end of a tape in the tape recorder has almost completely unwound from a tape reel in the tape recorder and for indicating the level of a battery provided in the tape recorder comprising voltage comparator means for comparing the voltage of the battery internally housed within the tape recorder against a reference level which is required for the normal operation of the tape recorder and to produce an output signal when the battery voltage is reduced below the reference voltage; said tape having a non-record zone at each end thereof;

tape end detector means positioned adjacent to the tape and being responsive to the movement of the tape for normally producing an output signal during the running of the tape, the output signal of the detector means being absent when a non-record zone at one terminal end of the tape passes said detector means; and AND circuit coupled to the voltage comparator means and the detector means for receiving an output signal from the detector means and from the voltage comparator means, and display means connected with the output of the AND circuit to be illuminated only when the battery voltage is at least equal to the reference level and when the tape is running and has not completely unwound from the reel whereby the signals from said comparator means and detector means are simultaneously applied to the AND circuit under such conditions.

DESIGN PATENTS

GRANTED JANUARY 11, 1977

ERRATA

For CLASS	See PATENT NO.
011–152	243,030
011–152	243,031
011–149	243,032

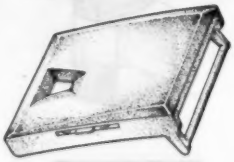
DESIGNS

JANUARY 11, 1977

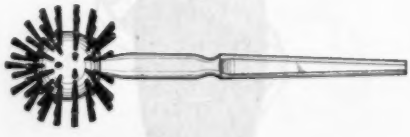
NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

242,961
HAT
Nathan R. Strongin, 53-44 199th St., Flushing, N.Y. 11365
Filed Sept. 8, 1975, Ser. No. 611,069
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—251

242,962
BELT BUCKLE
Michael Lackman, 9320 St. Lawrence Blvd., Montreal, Quebec, Canada
Filed Sept. 13, 1974, Ser. No. 505,923
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—427

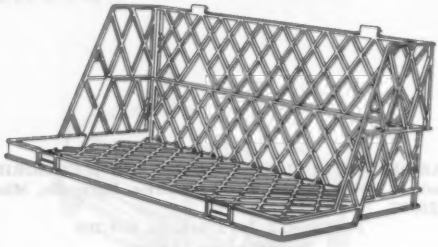


242,963
HAIRBRUSH
Edwin Glasberg, Woodmere, N.Y., assignor to Brynel Incorporated, Allston, Mass.
Filed Oct. 3, 1975, Ser. No. 637,327
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—31



242,964
CHAIR
Rodney R. Haynes, Sr., Richmond, Va., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Aug. 14, 1975, Ser. No. 604,579
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—47

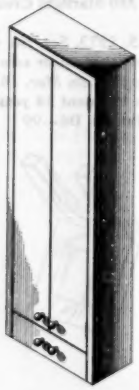
242,965
DISPLAY SHELF
Theodor M. Box, 1108 Aileen Road, Brielle, N.J. 08730
Filed Apr. 10, 1975, Ser. No. 566,820
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—85



242,966
STRINGED INSTRUMENT HOLDER
Barbara D. MacMillan, 350 Starlight Crest Drive, La Canada, Calif. 91011
Filed Oct. 15, 1973, Ser. No. 406,546
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Term of patent 14 years
Int. Cl. D6—99
U.S. Cl. D6—114

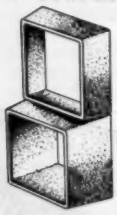
242,967
COMBINED KEY RACK AND CONTAINER THEREFOR
Donald L. Parkins, 846 S. 35th Ave., Omaha, Nebr. 68105
Filed Apr. 7, 1975, Ser. No. 565,520
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—157

242,968
CABINET FOR HOLDING NECKTIES AND ACCESSORIES
Louis E. Gulick, 13416 Washburn Drive, Burnsville, Minn. 55337
Filed Sept. 2, 1975, Ser. No. 609,209
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—164



242,969
TABLE
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Dec. 4, 1974, Ser. No. 529,593
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175

242,970
PHOTOGRAPH HOLDER
Bernard Cohen, Lansdale, Pa., assignor to C. F. Associates, Lansdale, Pa.
Filed Jan. 23, 1975, Ser. No. 543,237
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—234

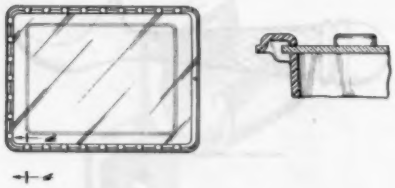


242,971
GLASS TUMBLER
John J. Schlichter, Columbus, Ohio, assignor to Federal Paper Board Company, Inc., Columbus, Ohio
Filed May 9, 1975, Ser. No. 576,154
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—5

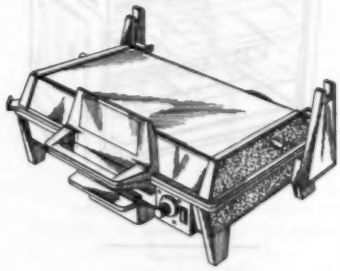
242,972
BOWL
Evangeline Day, 1 Van Buren Ave., Butler, N.J. 07405
Filed June 17, 1975, Ser. No. 587,622
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—24

242,973
GRATER
Robert H. C. M. Daenen, Beukenlaan, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Apr. 2, 1975, Ser. No. 564,503
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—47

242,974
COVERED STORAGE CONTAINER
Robert C. Hazzard, Portage, Wis., assignor to Portage Industries Corporation, Portage, Wis.
Filed Mar. 17, 1975, Ser. No. 559,150
Term of patent 14 years
Int. Cl. D7—*07*
U.S. Cl. D7—76



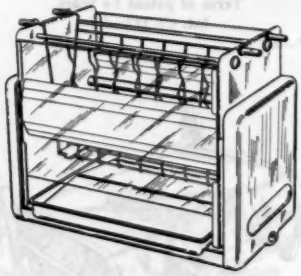
242,975
ELECTRIC BROILER GRILL OR SIMILAR ARTICLE
Theodore G. Daher, Stratford, Conn., assignor to General Electric Company
Filed July 21, 1975, Ser. No. 597,826
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—88



242,976
ICE CREAM SERVER
Clarence M. Mason, 2318 Sherwood Ave., Toledo, Ohio 43614
Filed July 10, 1975, Ser. No. 594,594
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—100

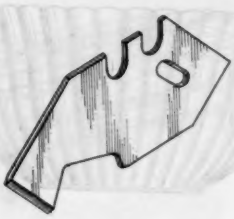
242,977
ICE CREAM SERVER
Clarence M. Mason, 2318 Sherwood Ave., Toledo, Ohio 43614
Filed July 10, 1975, Ser. No. 594,595
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—100

242,978
VERTICAL GRILL
Claude Caudron, Vagney, France, assignor to S E B, Selongey, France
Filed Feb. 20, 1976, Ser. No. 660,025
Claims priority, application France, Sept. 4, 1975, 75.109
Term of patent 14 years
Int. Cl. D7—*05*; D15—*05*
U.S. Cl. D7—110

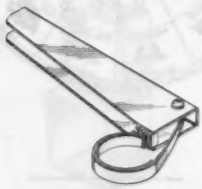


242,979
ARTICLE OF FLATWARE
Ford J. Lanzoni, Yalesville, Conn., assignor to International Silver Company, Meriden, Conn.
Filed Apr. 28, 1975, Ser. No. 571,841
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

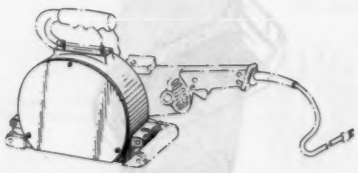
242,980
UTILITY BLADE
Harrison P. Fuller, Roslyn, N.Y., and Howard Strauss, Elberon, N.J., assignors to Omega Precision Hand Tools, Inc., College Point, N.Y.
Filed Oct. 15, 1975, Ser. No. 622,774
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—20



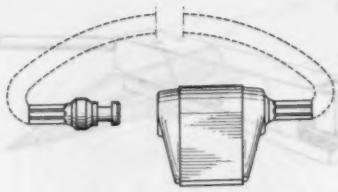
242,981
ADJUSTABLE STRAP WRENCH
Roger R. Craig, 21217 W. Bellini Drive, Topanga, Calif. 90290
Filed Dec. 3, 1975, Ser. No. 637,296
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—22



242,982
CASING FOR GRINDER TOOLS
Elwin H. Flickenstein, Alden, and Walter N. Welsch, Tonawanda, both of N.Y., assignors to Dynabrade, Inc., N. Tonawanda, N.Y.
Filed Sept. 17, 1975, Ser. No. 614,211
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—70

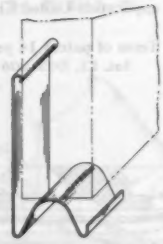


242,983
WIRE LOCK BODY FOR MOTORCYCLES AND THE LIKE
Hisashi Saitou, Nagoya, Japan, assignor to Kabushiki Kaisha Saikosha Seisakusho, Kasugai, Japan
Filed Oct. 10, 1975, Ser. No. 621,623
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—113

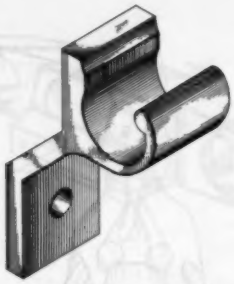


242,984
HAND GRIP
Preston L. Petty, 403 N. Main St., Newberg, Oreg. 97132
Filed Feb. 9, 1976, Ser. No. 656,724
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—138

242,985
DOOR STOP
Anthony M. Sasgen, 1S 174 Ingersoll Lane, Villa Park, Ill. 60181
Filed Apr. 21, 1976, Ser. No. 678,915
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—203



242,986
CURTAIN ROD BRACKET
Ljot M. Inglis, 13463 Sayre, Sylmar, Calif. 91342
Filed Apr. 21, 1975, Ser. No. 558,708
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—239

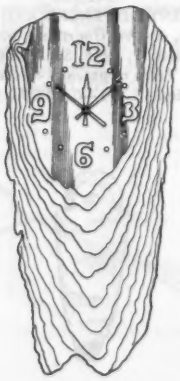


242,987
BOTTLE
Richard L. Weckman, Perrysburg, Ohio, assignor to Owens-Illinois, Inc.
Filed July 2, 1975, Ser. No. 592,426
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—125

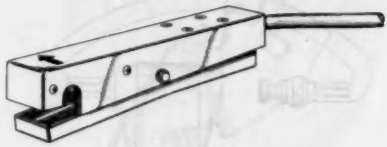
242,988
COMBINED FLINT DISPENSER AND SCREWDRIVER
John S. Derderian, 434 W. Courtland, Mundelein, Ill. 60060
Filed Dec. 1, 1975, Ser. No. 636,683
Term of patent 14 years
Int. Cl. D9—*01*; D27—*99*
U.S. Cl. D9—187

242,989
COVERED BASKET
May Becker, 1125 N. Howard Blvd., No. 4, Tucson, Ariz. 85716
Filed Oct. 10, 1974, Ser. No. 513,940
Term of patent 14 years
Int. Cl. D9—*04*
U.S. Cl. D9—246

242,990
WALL CLOCK
Donald H. Jorgenson, Redwood Falls, Minn., assignor to Earth Clocks Incorporated, Redwood Falls, Minn.
Filed Aug. 15, 1975, Ser. No. 604,948
Term of patent 7 years
Int. Cl. D10—*01*
U.S. Cl. D10—20



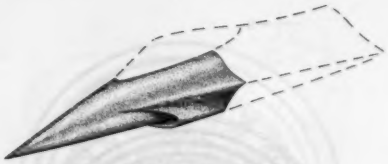
242,991
ELECTRICAL CURRENT PROBE
Thomas J. McKenzie, Granby, and Joseph T. Fleming, E. Granby, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.
Filed May 27, 1975, Ser. No. 580,708
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—79



242,992
INTRUSION DETECTOR
Russ J. Moure, White Plains, Md., assignor to International Armament Corporation, Alexandria, Va.
Filed Aug. 15, 1975, Ser. No. 605,043
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—106

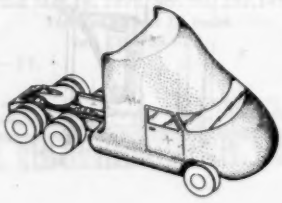
242,993
HULL OF A BOAT
Charles Michael Corbett Ross, Bath, England, assignor to Rotork Marine Limited, Bristol, England
Filed Sept. 2, 1975, Ser. No. 609,748
Claims priority, application United Kingdom, July 22, 1975, 971913/74
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62

242,994
AIRCRAFT NOSE AND INLET
Constant Prokop, Huntington, N.Y., assignor to Fairchild Industries, Inc.
Filed Nov. 24, 1975, Ser. No. 634,820
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D12—81

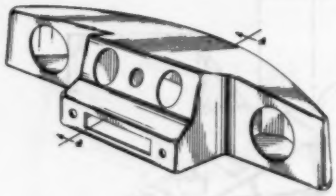


242,995
TRUCK
Harold Isaacs, 2567 Lafayette Drive, University Heights, Ohio 44118
Filed Aug. 18, 1975, Ser. No. 605,744
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—96

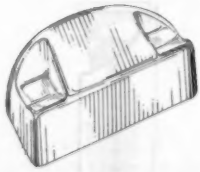
242,996
TRUCK CAB
Ronald A. Servais, 7359 Mohawk Trail, Dayton, Ohio 45459, and Paul T. Bauer, 4048 Eckworth Drive, Bellbrook, Ohio 45305
Filed Oct. 8, 1975, Ser. No. 620,593
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—97



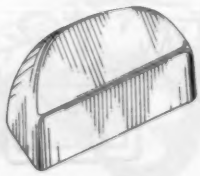
242,997
ACCESSORY CONSOLE FOR MOTORCYCLES
Tommy W. Dixson, 1509 W. Willetta, Phoenix, Ariz. 85007
Filed July 28, 1975, Ser. No. 599,828
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—114



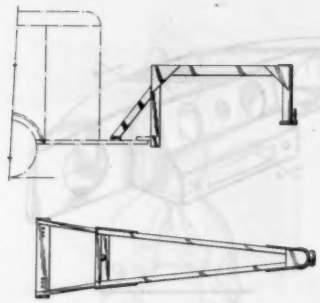
242,998
MOTORCYCLE ACCESSORY CONSOLE
Tommy W. Dixson, 1509 W. Willetta, Phoenix, Ariz. 85007
Filed Jan. 2, 1976, Ser. No. 646,190
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—114



242,999
ACCESSORY CONSOLE FOR MOTORCYCLES
Tommy W. Dixson, 1509 W. Willetta, Phoenix, Ariz. 85007
Filed Jan. 2, 1976, Ser. No. 646,191
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—114

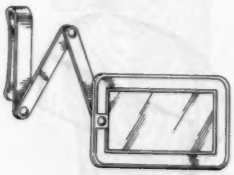


243,000
GOOSENECK TRAILER HITCH CONVERTER
Marvin T. Carnes, Rte. 1, Crescent, Okla. 73028
Filed Dec. 10, 1975, Ser. No. 639,378
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—162

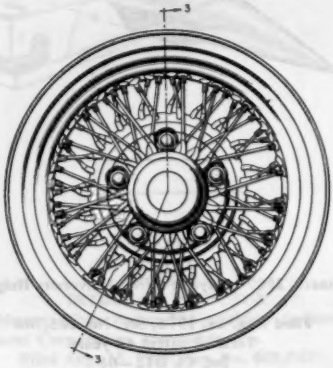


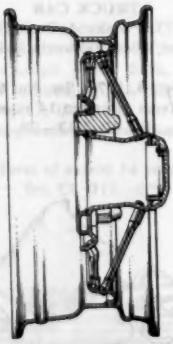
243,001
WIND DEFLECTOR FOR TRUCK TRAILERS
Robert C. Anziano, 4291 Fireside Circle, Irvine, Calif. 92664
Filed Dec. 18, 1975, Ser. No. 641,878
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—181

243,002
SUN SHADE FOR AN AUTOMOBILE DRIVER
Donald W. Heckathorn, 31556 Agoura Rd. Apt. No. 1, West Lake Village, Calif. 91361
Filed July 17, 1975, Ser. No. 596,802
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—191

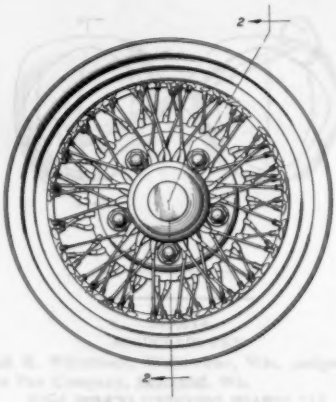


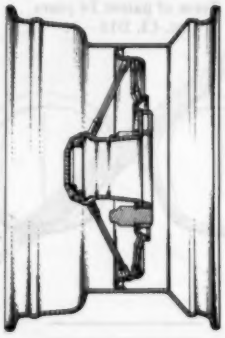
243,003
AUTOMOBILE WIRE WHEEL
Merlyn R. Reppert, Torrance, Calif., assignor to W. R. Grace & Co., New York, N.Y.
Filed Nov. 7, 1974, Ser. No. 521,705
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—205





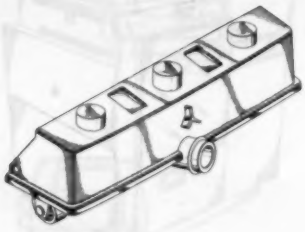
243,004
WIRE WHEEL
Merlyn Ralph Reppert, Torrance, Calif., assignor to W. R. Grace & Co., New York, N.Y.
Continuation-in-part of Ser. No. 521,705, Nov. 7, 1974. This application Mar. 17, 1976, Ser. No. 667,695
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—205





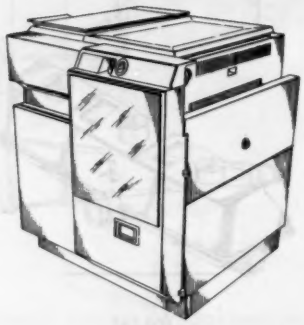
243,005
BUILDING
A. Gilbert McCree, 2110 Alden Road, P.O. Box 7457, Orlando, Fla. 32804
Filed May 10, 1972, Ser. No. 252,147
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—17

243,006
ADAPTORS FOR VACUUM CLEANERS
Earl R. Clowers, Anderson, S.C., assignor to The Singer Company
Filed May 14, 1975, Ser. No. 577,380
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—63



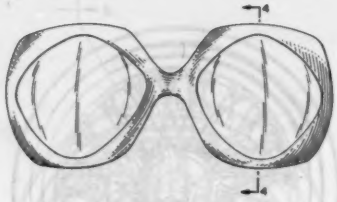
243,007
PHOTOGRAPHIC CAMERA
Hans-Kurt Uellenberg, Edingen, Germany, assignor to Ernst Leitz GmbH
Filed May 29, 1975, Ser. No. 581,891
Claims priority, application Germany, Dec. 18, 1974, 5175
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—8

243,008
COIN OPERATED REPRODUCTION MACHINE
Jacob W. Patla, Fairport; Wayne R. Smith, Henrietta; Wolfgang H. Tinz, Rochester, and Craig A. Smith, Pittsford, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed Jan. 27, 1975, Ser. No. 544,088
Term of patent 14 years
Int. Cl. D16—*04*
U.S. Cl. D16—30



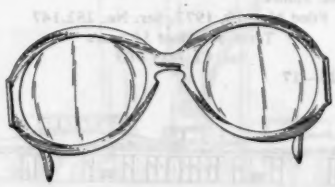
243,009
FLASH UNIT FOR A PHOTOGRAPHIC CAMERA
Hans-Ulrich Schade, Pfuhl, Germany, assignor to Foto-Quelle GmbH, Nuremberg, Germany
Division of Ser. No. 506,073, Sept. 16, 1974. This application Dec. 8, 1975, Ser. No. 638,229
Claims priority, application United Kingdom, June 14, 1974, 1090/74
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—42

243,010
PAIR OF SPECTACLES
Anthony Shindler, Brookline, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 9, 1976, Ser. No. 656,561
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—6 S



243,011
PAIR OF SPECTACLES
Anthony Shindler, Brookline, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 9, 1976, Ser. No. 656,452
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

243,012
PAIR OF SPECTACLES
Larry G. Loughner, Andover, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 9, 1976, Ser. No. 656,453
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

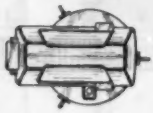


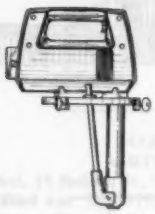
243,013
ROLLING STRAIGHT EDGE
Douglas F. Jones, 5063 Margo Drive, Las Vegas, Nev. 89122, and Eugene F. Costa, 1 Kelton Court, Oakland, Calif. 94611
Filed Feb. 15, 1974, Ser. No. 442,923
Term of patent 3½ years
Int. Cl. D19—*06*
U.S. Cl. D19—37

243,014
FOUNTAIN PEN
Frederick R. Wittnebert, Whitewater, Wis., assignor to The Parker Pen Company, Janesville, Wis.
Filed June 17, 1974, Ser. No. 480,212
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—47

243,015
FISHING LURE
Douglas W. Parker, 2720 S. Waldron Road, Fort Smith, Ark. 72901
Filed Mar. 1, 1976, Ser. No. 662,689
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—28

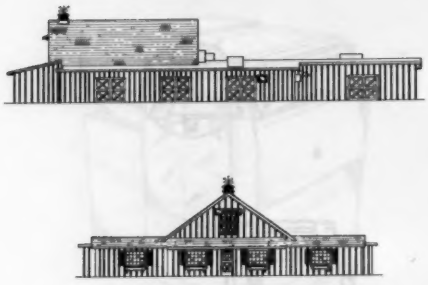
243,016
SPRAY UNIT
George W. Bills, Golden Valley, and Marvin J. Eull, St. Michael, both of Minn., assignors to Graco Inc., Minneapolis, Minn.
Filed Mar. 1, 1976, Ser. No. 662,365
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—17





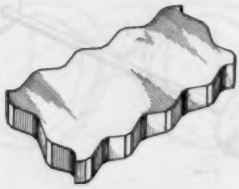
243,017
CONTAINER FOR AIR FRESHENER
Gregory F. Fossella, Marshfield, Mass., assignor to Certified Chemicals Incorporated, Camden, N.J.
Filed July 16, 1975, Ser. No. 596,536
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150

243,018
RESTAURANT BUILDING
Edward Wallace Barr, Jr., Bowling Green, Ky., assignor to Briarpatch, Inc., Bowling Green, Ky.
Filed Sept. 12, 1975, Ser. No. 612,657
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—22

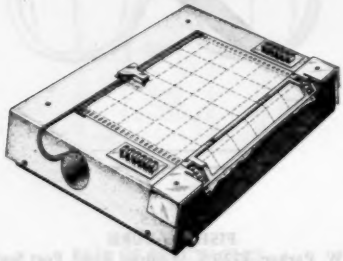


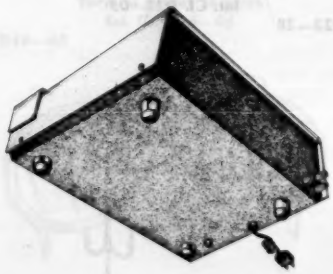
243,019
SWIMMING POOL LADDER
Raymond C. Confer, Gasport, N.Y., assignor to Confer Plastics, Inc., North Tonawanda, N.Y.
Filed May 5, 1975, Ser. No. 574,431
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D25—64

243,020
PAVING BLOCK
Anthony F. Inderwick, 185 Highway 15, Ottawa, Ontario, Canada (K2H 5Z2)
Filed June 5, 1975, Ser. No. 583,912
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—80

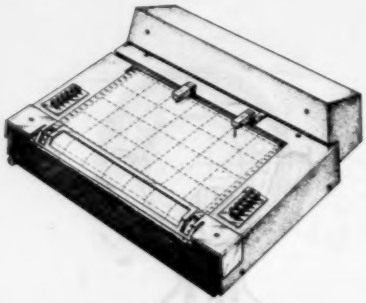


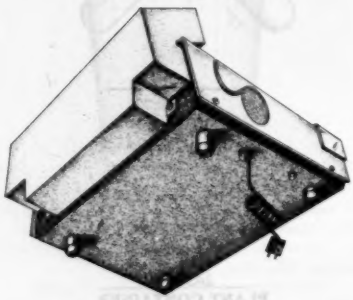
243,021
RECORDING INSTRUMENT
John F. Walker, Warminster, and Harold T. Muse, Drexel Hill, both of Pa., assignors to Honeywell Inc., Minneapolis, Minn.
Filed Mar. 28, 1975, Ser. No. 563,110
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D26—14 C



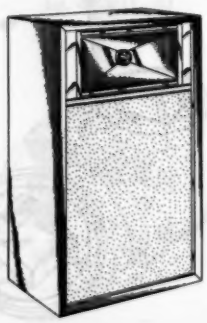


243,022
RECORDING INSTRUMENT
John F. Walker, Warminster, and Harold T. Muse, Drexel Hill, both of Pa., assignors to Honeywell Inc., Minneapolis, Minn.
Filed Mar. 28, 1975, Ser. No. 563,111
Term of patent 14 years
Int. Cl. D14—*01*; D10—*04*
U.S. Cl. D26—14 C

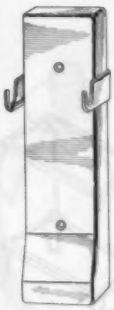




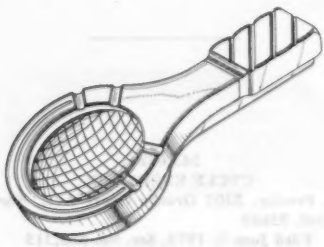
243,023
HORN SPEAKER
Arthur Robson, Jericho, N.Y., assignor to Morse Electro Products Corporation, Brooklyn, N.Y.
Division of Ser. No. D. 388,331, Aug. 13, 1973, Pat. No. 235,562. This application Apr. 7, 1975, Ser. No. 565,771
Term of patent 14 years
Int. Cl. D14—*01, 03*
U.S. Cl. D26—14 G



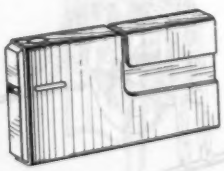
243,024
COMBINED TRANSCEIVER AND MOUNTING BRACKET FOR USE IN INTERCOM DEVICES
Peter Pablik, Salzburg, Austria, assignor to Ring-Control Electronic-Handelsgesellschaft m.b.H., Salsburg, Austria
Filed Nov. 3, 1975, Ser. No. 628,249
Term of pateat 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 K



243,025
ASHTRAY
Joan B. Sickul, 10 Hobson St., Stamford, Conn. 06902
Filed Apr. 28, 1975, Ser. No. 572,229
Term of patent 14 years
Int. Cl. D27—*03*
U.S. Cl. D27—22



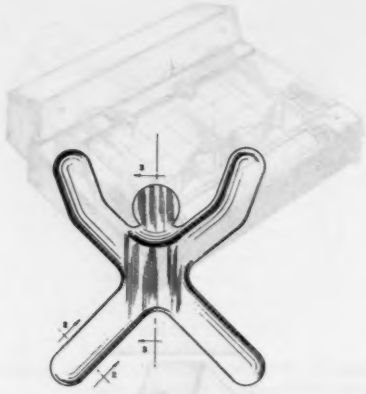
243,026
LIGHTER
Franz Alban Stuetzer, Mulheim (Main), Germany, assignor to Rowenta-Werke, GmbH, Offenbach(Main), Germany
Filed Nov. 24, 1975, Ser. No. 634,956
Claims priority, application Germany, May 30, 1975, 5 MR 9869
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42



243,027
AQUARIUM STAND
Richard S. Young, Frankenmuth, and Leo E. Hearn, Flint, both of Mich., assignors to Pentaco Enterprises Corporation, Clio, Mich.
Division of Ser. No. 261,096, June 12, 1972, Pat. No. 233,050.
This application Dec. 3, 1973, Ser. No. 421,056
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D30—12

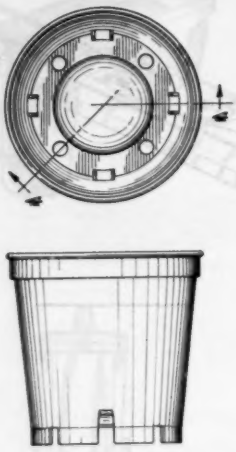
243,028
CYCLE EXERCISER
Richard I. Proctor, 3201 Orange Grove Ave., North Highlands, Calif. 95660
Filed June 9, 1975, Ser. No. 585,315
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 K

243,029
BOOMERANG
Richard P. Crew, 1635A Walea St., Wahiawa, Hawaii 96786
Filed June 9, 1975, Ser. No. 585,383
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 PP



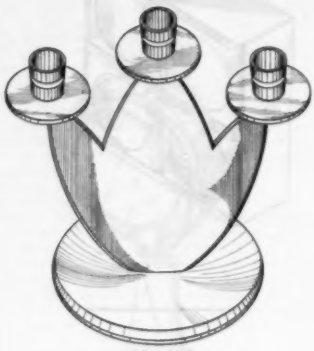
243,030
PLANT CONTAINER
Ronald John Gross, 10 Surrey Road, Mount Waverley, Victoria, Australia
Filed Nov. 11, 1974, Ser. No. 522,916
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—152

243,031
STACKABLE FLOWER POT
Dennis C. Anderson, Northfield, Minn., assignor to National Polymers, Inc.
Filed June 2, 1975, Ser. No. 582,895
Term of patent 14 years
Int. Cl. D11—02
U.S. Cl. D11—152



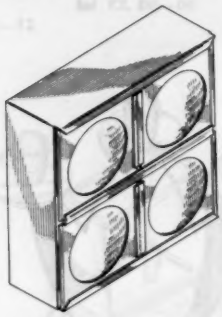
243,032
PLANTER
Dale R. Hodges, 4103 Inwood Road, Dallas, Tex. 75209
Filed Sept. 17, 1975, Ser. No. 613,972
Term of patent 14 years
Int. Cl. D11—02
U.S. Cl. D11—149

243,033
CANDLE HOLDER
Vladimir Benes, 2157 N. Shore Road, Bellingham, Wash. 98225
Filed Nov. 10, 1975, Ser. No. 630,663
Term of patent 14 years
Int. Cl. D26—01
U.S. Cl. D48—2

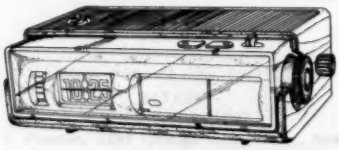


243,034
REFLECTOR FOR A PORTABLE ELONGATED LAMP
Fred E. Marsh, Jr., P.O. Box 11463, Knoxville, Tenn. 37919
Filed Sept. 10, 1975, Ser. No. 612,001
Term of patent 14 years
Int. Cl. D26—05
U.S. Cl. D48—16 D

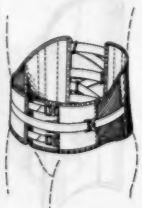
243,035
STAGE LIGHT
Gerald H. Kohlenstein, 310 N. Chicago St., New Buffalo, Mich. 49117
Filed Jan. 9, 1976, Ser. No. 647,992
Term of patent 14 years
Int. Cl. D26—*03*
U.S. Cl. D48—20 K



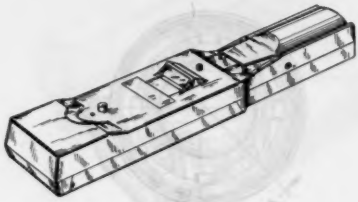
243,036
CLOCK RADIO
Masanori Hamada, Moriguchi, Japan, assignor to Matsushita Electric Industrial Co., Kadoma, Japan
Filed Oct. 10, 1974, Ser. No. 513,947
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B



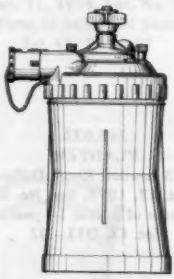
243,037
LUMBO-SACRAL SUPPORT
Irving Spiro, Miami, Fla., assignor to All Orthopedic Appliances, Inc.
Filed Aug. 22, 1974, Ser. No. 499,765
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D83—1 J

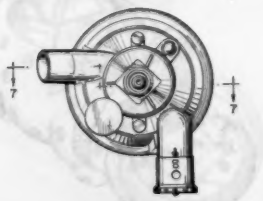


243,038
ELECTRONIC METER FOR DETERMINING HUMAN PULSE RATE FROM A FINGERTIP
Phillip E. Ray, Denver, Colo., assignor to Electromedics, Inc.
Filed Apr. 14, 1975, Ser. No. 567,542
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—1 F



243,039
NEBULIZER UNIT OR SIMILAR ARTICLE
Robert J. Aul, Perrysburg, Ohio; Robert S. Babington, McLean, Va.; Glenn H. Dunlap, Maumee, and Wayne J. Zitkus, Toledo, both of Ohio, assignors to American Hospital Supply Corporation, Evanston, Ill.
Filed May 14, 1975, Ser. No. 577,528
Term of patent 14 years
Int. Cl. D24—*03*
U.S. Cl. D83—1 N



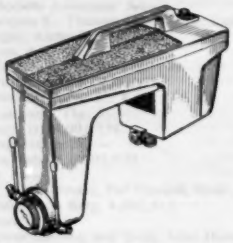


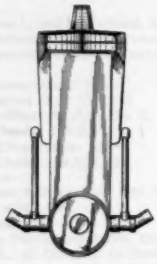
243,040

HYDROTHERAPY BATH ASSEMBLY

Clifford E. Grube, Niles, Ill., assignor to Associated Mills, Inc. an Illinois Corporation, Ill.

Filed Mar. 12, 1976, Ser. No. 666,481
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—1 C





243,041

LOOKING GLASS OR SIMILAR ARTICLE

Walter C. Anderson, West Redding, Conn., assignor to General Electric Company

Filed Aug. 29, 1975, Ser. No. 608,918
Term of patent 7 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 H

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF JANUARY, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Christiaens Societe Anonyme: *See*—
Delarge, Jacques E.; Thunus, Leopold N.; Lapiere, Charles-Leon; and Georges, Andre H., 4,002,629.
Schmid, Hans, 4,002,303.

A. H. Robins Company, Incorporated: *See*—
Cale, Albert Duncan, Jr., 4,002,757.
Welstead, William John, Jr., 4,002,766.

A. L. Garber Company, The: *See*—
Fecko, Francis D., 4,001,958.

A. O. Smith Corporation: *See*—
Brauer, John Robert, 4,002,935.

A/S Cheminova: *See*—
Solli, Hauk; Klemmensen, Per Dausell; Holst, Preben Lindholm; and Madsen, Hans Berg, 4,002,615.

Abbott Laboratories: *See*—
Johnson, Edwin Samuel; and Seely, John Hunter, 4,002,738.

Abe, Tadashi; and Ishigaki, Yukinobu, to Matsushita Electric Industrial Co., Ltd.; and Victor Company of Japan, Limited. Angle-modulated signal transmission system. 4,002,840, Cl. 179-15.0BT.

Abraham, Bernard M.; and Schreiner, Felix, to United States of America, Energy Research and Development Administration. Method for thermochemical decomposition of water. 4,002,729, Cl. 423-579.000.

Abu-El-Haj, Marwan J.; and McFarland, James W., to Hoechst Aktiengesellschaft. Certain novel substituted tetrahydra-oxothiazolotriazolium compounds useful as herbicides. 4,002,636, Cl. 260-306.70T.

ACF Industries, Incorporated: *See*—
Parchmont, Harvey O., 4,002,316.

Acieries de Gennevilliers Anciens Ets. C. Delachaux: *See*—
Bonne, Jean-Claude, 4,002,371.

Acme Steel Door Corporation: *See*—
Hoenigmann, Gustave, 4,002,332.

Adachi, Keiichi: *See*—
Hinata, Masanao; Mihara, Yuji; Ohi, Reiichi; Adachi, Keiichi; and Sato, Akira, 4,002,480.

Adam, Colin McLean: *See*—
Bainbridge, Ian Frank; and Adam, Colin McLean, 4,002,502.

Adelman, Robert L., to Du Pont de Nemours, E. I., and Company. Electroplatable polypropylene compositions. 4,002,595, Cl. 260-42.470.

Adelman, Stephen; and Greenspan, Marshall, to United Technologies Corporation. Digital prefilter for clutter attenuation in MTI radars. 4,003,052, Cl. 343-7.700.

Aelterman, Marcel; De Loucker, Gustaaf; Van Bouwel, Leo; Stievenart, Emile; Koninger, Horst; Schausberger, Helmut; Ertl, Franz; Rohr, Horst; and Geyken, Erwin, to AGFA-Gevaert, A.G. Method and apparatus for preparing photoprocessing solutions, and the like. 4,002,267, Cl. 222-1.000.

Aerpat A.G.: *See*—
Bradley, William David; and Denham, Keith, 4,002,099.

Aeschliman, Eugene, to DeSoto, Inc. Console cabinet for portable television receiver. 4,002,831, Cl. 358-254.000.

Aetna-Standard Engineering Company: *See*—
Pozsgay, Dezsoe Albert, 4,002,048.

AGFA-Gevaert, A.G.: *See*—
Aelterman, Marcel; De Loucker, Gustaaf; Van Bouwel, Leo; Stievenart, Emile; Koninger, Horst; Schausberger, Helmut; Ertl, Franz; Rohr, Horst; and Geyken, Erwin, 4,002,267.
Ganser, Friedrich; Hammer, Thomas; Frick, Hans Dieter; Viehrig, Wolfgang; Ritter, Karl Heinz; Kwiatkowski, Wolfgang; Osegowitsch, Viktor; Glass, Josef; and Laar, Erwin, 4,002,310.

Aimants Ugimag S.A.: *See*—
Haberer, Jean-Paul, 4,002,508.

Air Products and Chemicals, Inc.: *See*—
Pryor, John A.; and Rowles, Howard C., 4,002,042.

Airco, Inc.: *See*—
Shrader, Robert L., 4,002,141.

Airheart Products, Inc.: *See*—
Martins, Samuel J., 4,002,084.

Aisin Seiki Kabushiki Kaisha: *See*—
Kondo, Toshiyuki; and Ando, Masamoto, 4,002,376.

Aizawa, Takeshi: *See*—
Hori, Michimasa; and Aizawa, Takeshi, 4,002,109.

Akamatsu, Masahiko, to Mitsubishi Denki Kabushiki Kaisha. AC output power control system. 4,002,958, Cl. 318-227.000.

Akashi, Goro; Fujiyama, Masaaki; Yamaguchi, Nobutaka; Takayama, Satoru; and Sasazawa, Koji, to Fuji Photo Film Co., Ltd. Magnetic recording material. 4,002,804, Cl. 428-539.000.

Akiyama, Kunio: *See*—
Kokawa, Tomoo; Nakao, Yoshikathu; and Akiyama, Kunio, 4,002,478.

Akiyoshi, Eisuke: *See*—
Takemura, Yozo; Akiyoshi, Eisuke; Matsukubo, Hiroshi; and Shibata, Toshihiko, 4,002,069.

Aksjeselskapet Mikro-Elektronik: *See*—
Tetlie, Per, 4,002,953.

Aktiebolaget Carl Munters: *See*—
Munters, Carl; and Norback, Per, 4,002,040.

Aktiebolaget Electrolux: *See*—
Eriksson, Bolik Anders Gottfrid, 4,001,912.

Aktiengesellschaft "Weser": *See*—
Nitzki, Leopold, 4,002,132.

Aktieselskabet Niro Atomizer: *See*—
Damgaard-Iversen, Jorgen; Gude, Klaus Erik; Hansen, Ove Emil; Lund, Bjorn; and Petersen, Mogens, 4,002,524.

Akzona Incorporated: *See*—
van der Burg, Willem Jacob, 4,002,632.
van der Vies, Johannes, 4,002,747.

Albright, Charles William; and Davis, Hubert Greenidge, to Union Carbide Corporation. Preconditioning treatment of coal to minimize agglomeration. 4,002,535, Cl. 201-9.000.

Alcorn, LeForest V., to Raymond Lee Organization, Inc., The, a part interest. Game apparatus. 4,002,340, Cl. 273-131.00A.

Aldrich, Paul E.; Berezin, Gilbert H.; and Dittmar, Bruce I., to Du Pont de Nemours, E. I., and Company. 1-Tertiary-alkyl-3-(substituted cyclohexenyl)ureas as antihypertensive agents. 4,002,767, Cl. 424-322.000.

Allen-Bradley Company: *See*—
Hanisch, Alfred H.; and Fensholt, Edward C., 4,002,398.

Allen, Joseph H.: *See*—
Daugherty, Kenneth E.; Luker, John P.; Allen, Joseph H.; and Klemm, Waldemar A., 4,002,483.

Allgeier, Hans; and Gagneux, Andre, to Ciba-Geigy Corporation. Diazepine derivatives in the treatment of tension, agitation and epilepsy. 4,002,764, Cl. 424-269.000.

Allied Chemical Corporation: *See*—
McLeod, John H., 4,002,607.

Alloway Manufacturing, Inc.: *See*—
Eisenhardt, Fred W., 4,002,206.

Alsch, Gottfried, to Naimer, Hubert Laurenz. Clutch for a rotary switch drive shaft. 4,002,088, Cl. 74-777.000.

Alto Corporation: *See*—
White, David Laverne, 4,002,091.

Aluminum Company of America: *See*—
Brown, Trenton L., 4,002,102.
Coop, Jackie A., 4,002,260.
Fennell, S. Reed, 4,002,967.
Martin, Guy E., 4,002,379.

Amagami, Keizo: *See*—
Kiuchi, Mitsuyuki; Kusunoki, Shigeru; Fujieda, Hiroshi; Amagami, Keizo; and Toyooka, Tadao, 4,002,875.

Ambar Investment Inc.: *See*—
Wallin, Sven-Herman, 4,001,980.

Ambrogi, Vittorio; Logemann, Willy; Parenti, Marc Antonio; and Tommasini, Raffaele, to Carlo Erba S.p.A. Pyrazine 4-oxide derivatives and process for their preparation. 4,002,750, Cl. 424-250.000.

Amerace Corporation: *See*—
Vecchiotti, Camillo M.; and Goldberg, Bruce S., 4,002,417.

American Air Filter Company, Inc.: *See*—
Kannapell, David H.; and Smith, Mervin L., 4,002,057.

American Cyanamid Company: *See*—
Balsley, Richard Benjamin; Soffer, Herbert; and Robbins, Woodrow Wilson, 4,002,605.
Bernstein, Seymour; Heller, Milton David; and Joseph, Joseph Peter, 4,002,745.
Robbins, Woodrow Wilson; Soffer, Herbert; and Balsley, Richard Benjamin, 4,002,603.
Strazdins, Edward, 4,002,588.

American Electromedics Corporation: *See*—
Klar, Irwin; Rock, Erwin H.; and Rochussen, Arthur W., 4,002,161.

American Micro-Systems, Inc.: *See*—
Jenne, Fredrick Benjamin, 4,003,036.

American Optical Corporation: *See*—
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Sussman, Milton H., 4,002,406.
Wallace, Henry W., 4,002,418.

American Pulverizer Company: *See*—
Miller, Donald G., 4,002,302.

Ames, Robert K.; and Peters, Hans H., to Resources Conservation Co. Oil emulsion processing. 4,002,562, Cl. 210-22.00R.

AMF Incorporated: *See*—
Fiore, Joseph V.; Kelly, T. Kenneth; and Nellen, William J., 4,002,178.

Oliver, Bill N., 4,002,166.
Amma, Michito, to Gakken Co. Ltd. System and device for overhead projection. 4,002,408, Cl. 353-70.000.
Amort, Jurgen: *See—*
Nestler, Heinz; Amort, Jurgen; and Plankl, Leo Hans, 4,002,800.
AMP Incorporated: *See—*
Merry, Roydon William; and Sherman, James Lee, 4,002,393.
Anderle, Robert C.; and Schwarz, Robert F., to S. C. Johnson & Son, Inc. Cleaning compositions. 4,002,571, Cl. 252-90.000.
Anderson, Robert Craig, to Imperial Chemical Industries Limited. Tobacco based smoking material. 4,002,176, Cl. 131-2.000.
Ando, Masamoto: *See—*
Kondo, Toshiyuki; and Ando, Masamoto, 4,002,376.
Andrea, Christo; Dupen, Clive Frederick George; and Noyes, Richard Croissant, to Combustion Engineering, Inc. Nuclear fuel handling apparatus. 4,002,529, Cl. 176-30.000.
Angehrn, Jorg August, to Dresser Industries, Inc. Well logging pad devices having differential pressure relief. 4,002,063, Cl. 73-152.000.
Angilletta, Domenick J. Venetian blind for solar heating. 4,002,159, Cl. 126-270.000.
Angus, Derek. Cyclone structure. 4,002,127, Cl. 110-8.00C.
Anner, Georg; and Wieland, Peter, to Ciba-Geigy Corporation. Halogenated 19-norsteroids. 4,002,614, Cl. 260-239.55D.
Ansaldo, Leonaldo: *See—*
Lang, Marcello; and Ansaldo, Leonaldo, 4,002,144.
Anson, James H., to Dickey-john Corporation. Magnetic sensing device. 4,002,937, Cl. 310-168.000.
Ansul Company, The: *See—*
Francis, David N., 4,001,949.
Aoki, Reijiro: *See—*
Takagi, Haruo; and Aoki, Reijiro, 4,003,030.
Aoki, Shigeru: *See—*
Shirai, Tadashi; Tashiro, Yasuhisa; and Aoki, Shigeru, 4,002,666.
Applebaum, David C.: *See—*
Mallozzi, Philip J.; Epstein, Harold M.; Applebaum, David C.; Gallagher, William J.; and Campbell, Bernerd E., 4,002,403.
Applicon Incorporated: *See—*
LaCanfora, Peter S., 4,003,061.
Applied Power Australia Limited: *See—*
Spalding, David I., 4,002,992.
Arai, Hiroshi: *See—*
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Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha: *See—*
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Arioli, Vittorio: *See—*
Cricchio, Renato; and Arioli, Vittorio, 4,002,752.
Cricchio, Renato; and Arioli, Vittorio, 4,002,754.
Arion, Nicolae Mihai, to Institutul de Proiectari Pentru Industria Chimica Anorganica si a Ingrasamintelor. Process for treating and recovering waste water from the fertilizer manufacture. 4,002,455, Cl. 71-1.000.
Arkangel, Robert, to Zimmer, U.S.A. Inc. Prosthetic joint for total knee replacement. 4,001,896, Cl. 3-1.910.
Armor Elevator Company: *See—*
Wiesendanger, Theodore O.; and Seals, John V., 4,002,973.
Armstrong Cork Company: *See—*
Nikolaus, Harold W.; and Wasson, Kenneth L., 4,001,985.
Piersol, Jay L., 4,002,527.
Arnar-Stone Laboratories, Inc.: *See—*
Gardella, Libero A.; and Kesler, Helen, 4,002,718.
Arnold, Dan M.: *See—*
Smith, Harry D., Jr.; Schultz, Ward E.; and Arnold, Dan M., 4,002,904.
Arnold, Fred E., to United States of America, Air Force. Preparation of polybenzimidazoles. 4,002,679, Cl. 260-556.00A.
Arntz, Friedrich Ottokar Wilhelm. Apparatus for the separation, and storage of hydrogen gas. 4,002,553, Cl. 204-278.000.
Arrow-Hart, Inc.: *See—*
Phillips, Bernard L., 4,002,870.
Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Bilyavsky, Anatoly Arkadievich; Gorodnitsyna, Vera Evdokimovna; Elkina, Evgenia Dmitrievna; Manaenkov, Valery Ivanovich; Polyanskaya, Ljudmila Nikolaevna; Sorokin, Jury Leonidovich; Taran, Anatoly Zakharovich; and Fadeev, Evgeny Alexeevich. Vertical separator. 4,002,444, Cl. 55-413.000.
Artzt, Peter: *See—*
Egbers, Gerhard; and Artzt, Peter, 4,002,019.
Arvidson, Harold Carl: *See—*
Bayless, John H.; and Arvidson, Harold Carl, 4,002,802.
Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Konno, Tsugio; Matsumoto, Kohichi; Ohkubo, Shinichi; Hashino, Yasuo; Maeda, Kaoru; and Sayanagi, Giichi, 4,002,567.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Niiho, Masaaki, 4,003,029.
Shono, Tetsuji, 4,003,066.
Ashley, James R.; Rast, Gustaf J., Jr.; and Barley, Thomas A., to United States of America, Army. Optimum threshold transmission line discriminator. 4,002,970, Cl. 324-57.00N.
Ashley, James R.: *See—*
Barley, Thomas A.; Rast, Gustaf J., Jr.; and Ashley, James R., 4,002,969.
Rast, Gustaf J., Jr.; Barley, Thomas A.; and Ashley, James R., 4,002,971.
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Atlas Copco Aktiebolag: *See—*
Schoeps, Knut Christian, 4,002,212.
Ato Chimie: *See—*
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Au, Alexander, to Fairchild Camera and Instrument Corporation. Sense amplifier circuit for a Random Access Memory. 4,003,034, Cl. 340-173.0CA.
Aurich, Christoph W.; and Turner, James Keith, to Gaston County Dyeing Machine Company. Wet processing means. 4,001,945, Cl. 34-155.000.
Austin, Michael M.; and Barrett, William G., to Sperry Rand Corporation. Automatic terminal and line speed detector. 4,003,032, Cl. 340-172.500.
Automatech Industries, Inc.: *See—*
Rovin, Herman; Opuszenski, Theodore; Pellicano, Joseph; and Swenson, Alan F., 4,002,130.
Axford, Roy Morgan. Motor powered by wave action. 4,002,416, Cl. 417-330.000.
B. F. Goodrich Canada Limited: *See—*
Sears, Henry Eldon; Prast, John Charles; McNally, Raymond Wiefred; Lee, Calvin C.; and McAvey, William F., 4,002,362.
B. F. Goodrich Company, The: *See—*
Dickens, Elmer Douglas, Jr., 4,002,597.
Knechtges, Donald P.; and Mikofalvy, Bela K., 4,002,801.
Minchak, Robert J., 4,002,815.
Porter, John Paul, 4,002,891.
Rainbolt, Jack D.; and Suerdieck, Ronald R., 4,002,226.
B & M Die Co., Inc.: *See—*
Smith, Billy R.; and Smith, Francis Moses, 4,002,092.
Babette Dixon, Trustee of Paul H. Dixon, Trust dated Jan. 28, 1975: *See—*
Dixon, Paul H., 4,002,247.
Dixon, Paul H., 4,002,265.
Baierl, Kenneth W., to Flambeau Paper Company. Chemical recovery from waste liquors utilizing indirect heat exchangers in multi-stage evaporation plus contact steam stripping. 4,002,525, Cl. 159-47.0WL.
Bailey, Alfred J.: *See—*
Crawford, Alexander; and Bailey, Alfred J., 4,002,272.
Bailey, John R., to Senturion Sciences, Inc. Continuous bit positioning system. 4,003,017, Cl. 340-15.5BH.
Bailey, Richard B. Toy bank with coin return. 4,002,335, Cl. 273-1.00E.
Bailly, Richard L. Foamed polymeric article and method for making the same. 4,002,787, Cl. 428-35.000.
Baimbridge, Charles L.; Minderhout, James R.; Bearman, Robert W.; and Carpenter, Donald E., to Nalco Chemical Company. Active grignard electrode. 4,002,548, Cl. 204-195.00F.
Bainbridge, Ian Frank; and Adam, Colin McLean, to Comalco Aluminium (Bell Bay) Limited; and University of Queensland, The. Aluminum base alloys. 4,002,502, Cl. 148-3.000.
Bakanov, Anatoly Fedorovich: *See—*
Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Bilyavsky, Anatoly Arkadievich; Gorodnitsyna, Vera Evdokimovna; Elkina, Evgenia Dmitrievna; Manaenkov, Valery Ivanovich; Polyanskaya, Ljudmila Nikolaevna; Sorokin, Jury Leonidovich; Taran, Anatoly Zakharovich; and Fadeev, Evgeny Alexeevich, 4,002,444.
Baker Oil Tools, Inc.: *See—*
Shurtleff, George S., 4,002,301.
Baker, Richard L., to Leisure Group, Inc., The. Cylinder-indexing means for revolvers. 4,001,962, Cl. 42-67.000.
Balco, Inc.: *See—*
Balzer, Claude P.; Reiff, Almer A.; and Corman, Edward M., 4,001,991.
Baldi, Luciano; and Martini, Emilio, to Montedison Fibre S.p.A. Conditioning of polyolefinic fibers for use in the manufacture of synthetic paper. 4,002,796, Cl. 428-375.000.
Baldwin-Gegenheimer Corporation: *See—*
MacPhee, John M.; and Gasparrini, Charles Robert, 4,002,047.
Ball Corporation: *See—*
Van Oosterhout, Jack T., 4,002,823.
Balsley, Richard Benjamin; Soffer, Herbert; and Robbins, Woodrow Wilson, to American Cyanamid Company. Calcium and magnesium salts of 4-(2-hydroxy-1-naphthylazo)-1-naphthalenesulfonic acid for dyeing fiberglass. 4,002,605, Cl. 260-195.000.
Balsley, Richard Benjamin: *See—*
Robbins, Woodrow Wilson; Soffer, Herbert; and Balsley, Richard Benjamin, 4,002,603.
Balzer, Claude P.; Reiff, Almer A.; and Corman, Edward M., to Balco, Inc. Stair nosing structure. 4,001,991, Cl. 52-179.000.
Banas, Conrad M., to United Technologies Corporation. Method of cutting with laser radiation and liquid coolant. 4,002,877, Cl. 219-121.0LM.
Banker, John G.; and Holcombe, Cressie E., Jr., to United States of America, Energy Research and Development Administration. Coating method for graphite. 4,002,784, Cl. 427-385.00R.
Barbe, Gerard; Habault, Robert; and Tamet, Jean-Louis, to Rhone-Poulenc-Textile. Crimped yarns and method for making them. 4,002,795, Cl. 428-370.000.
Barbier, Xavier N., to Societe Anonyme de Telecommunications. Multiplexed digital transmission system with means for channel insertion and extraction. 4,002,846, Cl. 179-15.0BD.
Barley, Thomas A.; Rast, Gustaf J., Jr.; and Ashley, James R., to United States of America, Army. Optimum length transmission line discriminator with low noise detector. 4,002,969, Cl. 324-57.00N.

Barley, Thomas A.: *See—*
Ashley, James R.; Rast, Gustaf J., Jr.; and Barley, Thomas A., 4,002,970.
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Berges, Dietrich; Damzog, Bodo; and Saam, Ulrich, 4,002,015.
Turk, Herbert; and Schiminski, Herbert, 4,002,307.

Barnhardt, Jacob C., Jr. Insulating building block. 4,002,002, Cl. 52-743.000.

Barpal, Isaac R., to Westinghouse Electric Corporation. Train vehicle speed control signal providing apparatus. 4,002,314, Cl. 246-63.00C.

Barr, Samuel Rothrock: *See—*
Nye, James Leroy; Barr, Samuel Rothrock; Chew, Thomas; and Steyer, William, 4,002,024.

Barrett, William G.: *See—*
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Barron, Mark B.: *See—*
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Bartovsky, Tomas; and Sladecek, Jiri, to Vysoka skola chemicko-technologicka. Method and apparatus for measuring the concentration of combustible components of a gas mixture. 4,002,429, Cl. 23-254.00E.

Bartz, Richard O. Earthworking tool with handle having triangularly arranged sides. 4,002,207, Cl. 172-378.000.

BASF Aktiengesellschaft: *See—*
Fahrbach, Gerhard; Seiler, Erhard; and Stein, Dieter, 4,002,703.
Hoerauf, Werner; Guenther, Ernst; Kissel, Ernst; Valentin, Guenter; and Dietrich, Ernst, 4,002,430.
Quadbeck-Seeger, Hans-Juergen; and Hoch, Helmut, 4,002,664.
Quadbeck-Seeger, Hans-Juergen; and Hoch, Helmut, 4,002,675.
Reuter, Peter; Eilingsfeld, Heinz; and Patsch, Manfred, 4,002,653.
Strohmeyer, Max; Hagen, Werner; and Hohenschutz, Heinz, 4,002,539.
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BASF Farben & Fasern Aktiengesellschaft: *See—*
Fritsche, Peter, 4,002,582.

Bash, D'Arle G. Solar heated device. 4,002,032, Cl. 60-641.000.

Baskin, Yehuda, to Ferro Corporation. Friction materials containing spinel solid solution as friction modifier. 4,002,592, Cl. 260-38.000.

Battelle Memorial Institute: *See—*
Mallozzi, Philip J.; Epstein, Harold M.; Applebaum, David C.; Gallagher, William J.; and Campbell, Bernerd E., 4,002,403.

Baudouin, Jacques, to Ciments Lafarge S.A. Process for the manufacture of a fine white filler for industrial purposes. 4,002,484, Cl. 106-306.000.

Baum, Kurt, to Verfahrenstechnik Dr.-Ing. Kurt Baum. Method for recovering reaction gases from steel converters which are bottom blown with oxygen and cooled with hydrocarbons. 4,002,467, Cl. 75-60.000.

Baumann, Bernard: *See—*
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Bayer Aktiengesellschaft: *See—*
Braden, Rudolf; Knupfer, Hans; and Hartung, Sigurd, 4,002,673.
Hajek, Manfred; and Wagner, Kuno, 4,002,601.
Huppertz, Andreas; Schultz, Peter; and Maertens, Dieter, 4,002,654.
Meiser, Werner; Kramer, Wolfgang; Buchel, Karl Heinz; and Plempel, Manfred, 4,002,763.
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 4,002,762.
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 4,002,641.
Sirrenberg, Wilhelm; and Homeyer, Bernhard, 4,002,744.

Bayless, John H.; and Arvidson, Harold Carl, to Du Pont de Nemours, E. I., and Company. Photographic subbing composition having improved anchorage. 4,002,802, Cl. 428-483.000.

Beard, Colin C.; Edwards, John A.; and Fried, John H., to Syntex (U.S.A.) Inc. 5(6)-Benzene ring substituted benzimidazole-2-carbamate derivatives having anthelmintic activity. 4,002,640, Cl. 260-309.200.

Bearman, Robert W.: *See—*
Baimbridge, Charles L.; Minderhout, James R.; Bearman, Robert W.; and Carpenter, Donald E., 4,002,548.

Beaver, Dennis; Hensley, J. R.; and Duff, Jerry. Table tennis training device. 4,002,336, Cl. 273-30.000.

Beck, John Brewer, to RCA Corporation. Magnetic recording and reproducing system with tape-to-head speed control. 4,003,090, Cl. 360-70.000.

Becker, Kurt, to Heye, Hermann. Arrangement for feeding gobs of plasticizable material in molds of a machine for the production of bottles or the like. 4,002,453, Cl. 65-207.000.

Beckman, Harold, Jr. Self propelled feed apparatus. 4,002,252, Cl. 214-83.320.

Beckman Instruments, Inc.: *See—*
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Beebe, Raymond A., to Massey-Ferguson Inc. Seed decelerating device. 4,002,266, Cl. 221-260.000.

Belitsky, Georgy Mironovich: *See—*
Slezinger, Isaak Isaevich; Belitsky, Georgy Mironovich; Shiryaev, Vladimir Alexandrovich; and Mironov, Jury Vasilievich, 4,002,934.

Bell, Charles Gilbert; and Randolph, Michael M. Fluid actuated gear changing system. 4,002,105, Cl. 92-62.000.

Bell, Ferris Andrew; and DePew, Thomas N., to said Thomas N. DePew, by said Ferris Andrew Bell. Pallet construction. 4,002,126, Cl. 108-53.500.

Bell, Oliver A., Jr.; and Gilleland, Randall C., to Colt Industries Operating Corporation. Servo feed system for a wire electrode type electrical discharge machining apparatus. 4,002,885, Cl. 219-69.00G.

Bell, Robert G. Coin roll cutter. 4,001,934, Cl. 30-124.000.

Bell, Ronald L., to Varian Associates, Inc. Solar energy converter with waste heat engine. 4,002,031, Cl. 60-641.000.

Bell Telephone Laboratories, Incorporated: *See—*
Blank, Stuart Lawrence, 4,002,803.
Bosik, Barry Sheldon; and Stone, Dale Eugene, 4,002,838.
Bridenbaugh, Paul Michael; Liao, Paul Foo-Hung; Tofield, Bruce Cedric; and Weber, Heinz Paul, 4,002,725.
Ching, Yau-Chau; Hofmann, Allan Michael; and Messerschmitt, David Gavin, 4,002,841.
Dail, James Edward, 4,002,847.
Kleinman, David Allmond; and Nelson, Donald Frederick, 4,002,897.
Mammel, Lewis Howard, 4,002,389.
Mandeville, Gordon James; and McLean, Dale Irving, 4,003,006.
Mattes, Hans George; and Oates, Daniel Edward, 4,002,853.
Miller, Gabriel Lorimer, 4,003,008.
Thomas, Edward Wherry, 4,002,974.
Wagner, Guy Robert; and Weisheit, David Allan, 4,002,381.
Welch, Robert Maurice, 4,002,033.

Bellis, Harold E.; and Booker, Donald E., to Du Pont de Nemours, E. I., and Company. Chemical plating process. 4,002,778, Cl. 427-98.000.

Bendix Corporation, The: *See—*
Cramer, Robert L.; and Mientus, James A., 4,002,039.
Taplin, Lael Brent, 4,002,077.

Benefiel, Robert Lee, to Eli Lilly and Company. Novel fluoroalkoxyphenyl-substituted nitrogen. 4,002,628, Cl. 260-251.00R.

Bengtsson, Sigurd Walter. Fitting for attachment to a piece of fabric. 4,001,924, Cl. 24-230.00F.

Bennett, David F. Articulated hose support. 4,002,357, Cl. 285-61.000.

Bennett, Richard J.; Gray, Lew T.; and Levy, Dale F., to Phillips Petroleum Company. Stabilizing open graded asphalt-concrete. 4,002,412, Cl. 404-17.000.

Bennett, Thomas H.; Carlow, Earl F.; Peddle, Charles; and Wiles, Michael F., to Motorola, Inc. Interrupt circuitry for microprocessor chip. 4,003,028, Cl. 340-172.500.

Benson, Gary G.; and Jones, Eugene R., to International Business Machines Corporation. Post-recognition segmentation for pattern-recognition machines. 4,003,023, Cl. 340-146.3SG.

Bentley, William F., Jr.: *See—*
Broce, Fred L.; Bentley, William F., Jr.; and Kilpatrick, William L., 4,003,060.
Luedtke, Arthur; and Bentley, William F., Jr., 4,003,057.

Berezin, Gilbert H.: *See—*
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Berges, Dietrich; Damzog, Bodo; and Saam, Ulrich, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Twisting machine. 4,002,015, Cl. 57-58.380.

Bergh, Sten Lennart: *See—*
Rohlin, Barbro Marie; Bergh, Sten Lennart; and Westerberg, Gustav Nils Herman, 4,002,509.

Bergwerksverband GmbH: *See—*
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Bernard, Arthur Alexander; and Bernard, Richard Allen, to Darex Corporation. Twist drill sharpener and aligning fixture. 4,001,975, Cl. 51-5.00R.

Bernard, Richard Allen: *See—*
Bernard, Arthur Alexander; and Bernard, Richard Allen, 4,001,975.

Bernasconi, Alexandre Antoine: *See—*
Dubois, Roland; and Bernasconi, Alexandre Antoine, 4,002,021.

Bernkrant, Keith David, to Firearms Import and Export Corporation. Telescoping collapsible ladder. 4,002,223, Cl. 182-156.000.

Bernstein, Seymour; Heller, Milton David; and Joseph, Joseph Peter, to American Cyanamid Company. Complement inhibitors. 4,002,745, Cl. 424-230.000.

Bertelsen, Robert C. Apparatus for closing flexible containers. 4,002,007, Cl. 53-138.00A.

Bethlehem Steel Corporation: *See—*
MacRae, Donald R.; Gold, Richard G.; Sandall, William R.; Thompson, Charles D.; and Cheplick, Peter G., 4,002,466.

Betz, John N. Machine for cutting slots in screw shanks. 4,001,906, Cl. 10-2.000.

Biggs, Fred Conner. Stock market investment game. 4,002,342, Cl. 273-134.0AE.

Bigou, Alphonse, to Societe B.F.B. Medicament which is utilizable in ophthalmology. 4,002,758, Cl. 424-263.000.

Bilyavsky, Anatoly Arkadievich: *See—*
Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Bilyavsky, Anatoly Arkadievich; Gorodnitsyna, Vera Evdokimovna; Elkina, Evgenia Dmitrievna; Manaenkov, Valery Ivanovich; Polyanskaya, Ljudmila Nikolaevna; Sorokin, Jury Leonidovich; Taran, Anatoly Zakharovich; and Fadeev, Evgeny Alexeevich, 4,002,444.

Bing, Colin C.: *See—*
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Binks Manufacturing Company: *See—*
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Binnee, Donald: *See—*
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Binz, Reiner: *See—*
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Biorex Laboratories, Limited: *See—*
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Bissell Inc.: *See—*
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Bissonette, Vernon Leon, to Eastman Kodak Company. Diffusion transfer processes and elements using or containing inert transitional metal complex oxidizing agents. 4,002,477, Cl. 96-3.000.
Bittner, Klaus-Jurgen: *See—*
Riegler, Ernst; Kron, Heinrich; and Bittner, Klaus-Jurgen, 4,001,914.
Bixby, Leon C., to Hendrick Manufacturing Company. Screen having parallel slots. 4,002,540, Cl. 204-24.000.
Blachford, John, to H. L. Blachford Limited. Lubricants for powdered metals. 4,002,474, Cl. 75-211.000.
Blackmore, Donald F., to General Motors Corporation. Valve assembly for exhaust system. 4,002,370, Cl. 298-1.00H.
Blanchard, Carl L., to United States of America, Interior. Deductive method for measuring ion concentration electrically. 4,002,428, Cl. 23-230.00R.
Blank, Stuart Lawrence, to Bell Telephone Laboratories, Incorporated. Magnetic bubble devices with controlled temperature characteristics. 4,002,803, Cl. 428-539.000.
Blank, Walter G., Sr.; Laacke, Frank; Priser, Jacob W.; and White, Robert W., to McDonnell Douglas Corporation. Aircraft conformal load carrying pallet. 4,002,313, Cl. 244-118.00R.
Bleicher, Manfred: *See—*
Wanner, Karl; Falchle, Jorg; Schmid, Wolfgang; Bleicher, Manfred; Hahner, Reinhard; and Kleine, Werner, Jr., 4,002,347.
Bliss, Denys Stanley, to Bliss Pendair Limited. Tracked air cushion vehicle systems. 4,002,124, Cl. 104-23.0FS.
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Bliss, Denys Stanley, 4,002,124.
Blucher, Richard L., to Catalyst Research Corporation. Electrolyte-depolarizers for thermal batteries. 4,002,498, Cl. 136-205.000.
Blumensaadt, Hans Christian, to Testa-Laboratorium A/S. Resuscitation training apparatus. 4,001,950, Cl. 35-17.000.
Boddicker, Horst: *See—*
Schuermann, Fritz; Muller, Herbert; and Boddicker, Horst, 4,001,942.
Bodor, Nicolae S.: *See—*
Higuchi, Takeru; Bodor, Nicolae S.; and Kuo, Yu-Neng, 4,002,756.
Boggs, Roger L.: *See—*
Vanlandingham, Harold W.; Boggs, Roger L.; Bullock, David A.; and Maytum, James N., 4,002,090.
Bonin, Werner: *See—*
Stahler, Gerhard; Emmel, Ludwig; and Bonin, Werner, 4,002,743.
Bonne, Jean-Claude, to Acieries de Gennevilliers Anciens Ets. C. Delachaux. Variable track vehicle wheel. 4,002,371, Cl. 301-9.0TV.
Booker, Donald E.: *See—*
Bellis, Harold E.; and Booker, Donald E., 4,002,778.
Boon, Bernard: *See—*
Troonen, Hugo; Roelants, Piet; and Boon, Bernard, 4,002,530.
Bordet, Jacques; and Gourlia, Jean-Paul, to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Method for the rapid analysis of a mixture of a number of substances by chromatography. 4,002,052, Cl. 73-23.100.
Borg-Warner Corporation: *See—*
Donaldson, Desmond M., 4,002,201.
Borge, Magne; and Lode, Torger, to Exxon Research and Engineering Company. Process of minimizing or preventing fouling. 4,002,554, Cl. 208-48.0AA.
Borggrefe, Gerhard, to Henkel & Cie G.m.b.H. Hydroxyethercarboxylic acids. 4,002,676, Cl. 260-535.00P.
Borman, August H., to General Motors Corporation. Hydrodynamic drive and slipping clutch. 4,002,228, Cl. 192-3.300.
Bornstein, Michael; and Carone, Sandra M., to Eli Lilly and Company. Method of preparing sterile essentially amorphous cefazolin for reconstitution for parenteral administration. 4,002,748, Cl. 424-246.000.
Borris, David P., to Research Corporation. Prevention and/or treatment of poison ivy dermatitis. 4,002,737, Cl. 424-94.000.
Borst, John A., to Owens-Corning Fiberglas Corporation. Level-sensitive system. 4,002,068, Cl. 73-302.000.
Bosik, Barry Sheldon; and Stone, Dale Eugene, to Bell Telephone Laboratories, Incorporated. Telephone ringing control circuits. 4,002,838, Cl. 179-2.50R.
Bossert, Friedrich: *See—*
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 4,002,762.
Bouillon, Claude: *See—*
Kalopissis, Gregoire; and Bouillon, Claude, 4,002,634.
Bourne, Alan Arthur; Chaston, Jack Chambers; and Darling, Alan Sydney, to Johnson Matthey & Co., Limited. Treatment of metals and alloy. 4,002,503, Cl. 148-11.50P.
Bousquet, Gilles: *See—*
Rambert, Andre; and Bousquet, Gilles, 4,001,897.
Bowen, Willard L., to Torrington Company, The. Roller bearing of superior run-out characteristics. 4,002,380, Cl. 308-207.00R.
Boxer, Lawrence: *See—*
Tolosa, Felix P.; and Boxer, Lawrence, 4,002,009.
Braden, Rudolf; Knupfer, Hans; and Hartung, Sigurd, to Bayer Aktiengesellschaft. Process for the preparation of unsaturated amino compounds. 4,002,673, Cl. 260-510.000.
Bradley, William David; and Denham, Keith, to Aerpat A.G. Rivet. 4,002,099, Cl. 85-74.000.
Bradley, Willie Ray. Prostate massager. 4,002,164, Cl. 128-67.000.
Brady, William A.: *See—*
Reiner, Lawrence L.; and Brady, William A., 4,002,339.
Brainard, David M.; and Brainard, Edward C., II, to Environmental Devices Corporation. Method and apparatus for cortical thermal therapy. 4,002,175, Cl. 128-399.000.
Brainard, Edward C., II: *See—*
Brainard, David M.; and Brainard, Edward C., II, 4,002,175.
Brammer, Hartmut: *See—*
Jooss, Helmut; Brammer, Hartmut; and Funke, Helmut, 4,002,868.
Brandt, Georg; and Kolar, Werner, to Georg Muller Kugellagerfabrik K.G. Apparatus for handling workpieces such as semiconductor substrates. 4,002,246, Cl. 214-1.0BH.
Branson, Charles D.; and Long, William D., Jr., to Robertshaw Controls Company. Refractory resistance terminal. 4,003,014, Cl. 338-326.000.
Brauer, John Robert, to A. O. Smith Corporation. Reciprocating linear motor. 4,002,935, Cl. 310-27.000.
Braun, Robert A.; and Mermelstein, Robert, to Xerox Corporation. Imaging process employing toner particles containing arylsulphonamide formaldehyde adduct. 4,002,776, Cl. 427-19.000.
Brauning, Gerhard, to Eastman Kodak Company. Automatic photographic shutter control apparatus. 4,003,067, Cl. 354-235.000.
Bremer, Noel J.; Milberger, Ernest C.; and Dolhyj, Serge R., to Standard Oil Company (Ohio), The. Preparation of maleic anhydride from n-butane. 4,002,650, Cl. 260-346.80A.
Brey, William Andrew: *See—*
Sedlacek, William S.; Paluch, Edward S.; and Brey, William Andrew, 4,002,856.
Brice, John C.; and Peruyero, Jose M. A., to Exxon Research and Engineering Company. Vapor-liquid separator. 4,002,432, Cl. 23-284.000.
Bridenbaugh, Paul Michael; Liao, Paul Foo-Hung; Tofield, Bruce Cedric; and Weber, Heinz Paul, to Bell Telephone Laboratories, Incorporated. Process for growing acicula of rare earth pentaphosphates. 4,002,725, Cl. 423-263.000.
Bridgestone Tire Company Limited: *See—*
Watanabe, Yasuo; and Miyajima, Toshiyuki, 4,002,587.
Broadbent, Edward Granville, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Truncated aerofoils having spanwise splitters. 4,002,312, Cl. 244-40.00R.
Broce, Fred L.; Bentley, William F., Jr.; and Kilpatrick, William L., to United States of America, Federal Communications Commission. Direction finding receiver. 4,003,060, Cl. 343-113.0PT.
Broeckx, Willy P.; and Dulog, Lothar G., to S.A. Texaco Belgium N.V. Diesel fuel composition. 4,002,437, Cl. 44-66.000.
Broersma, Harmen. Transducer and method of making same. 4,002,863, Cl. 179-180.000.
Brogli, Hans G.; and Brogli, Werner F. Homogenization stirrer. 4,002,326, Cl. 259-95.000.
Brogli, Werner F.: *See—*
Brogli, Hans G.; and Brogli, Werner F., 4,002,326.
Brookfield Engineering Laboratories, Inc.: *See—*
Brookfield, Richard A.; and Ritzinger, Karl R., 4,002,960.
Brookfield, Richard A.; and Ritzinger, Karl R., to Brookfield Engineering Laboratories, Inc. Torque controlled tapping device. 4,002,960, Cl. 318-257.000.
Browand, Cecil Carlton Flashing address-indicating door sign. 4,003,040, Cl. 340-332.000.
Brown Boveri-Sulzer Turbomaschinen Aktiengesellschaft: *See—*
Hartmann, Max, 4,002,023.
Brown, Harry W., to Cutler-Hammer, Inc. Double-throw rocker switch with selective lockout means. 4,002,874, Cl. 200-321.000.
Brown, John Buchanan; and Gardiner, Frank J., to Laser Graphic Systems Corporation. Apparatus for compensating for optical error in a rotative mirror. 4,002,830, Cl. 358-293.000.
Brown, Johnny Milton: *See—*
Edwards, Joseph Franklin; Brown, Johnny Milton; Christian, James Vernon; and Elkins, Clayton, 4,002,372.
Brown, Kenton J.; and Kempf, Arthur W., to International Paper Company. Oxygen-alkali delignification of low consistency wood pulp. 4,002,526, Cl. 162-57.000.
Brown, Lynnie Barry: *See—*
Konrad, Charles Edward; and Brown, Lynnie Barry, 4,002,972.
Brown, Michael Harold, to United Kingdom Atomic Energy Authority. Thermoelectric batteries. 4,002,497, Cl. 136-202.000.
Brown, Richard C.; and Shuster, Stuart B., to General Motors Corporation. Compact refrigerator combined with top storage container. 4,002,384, Cl. 312-284.000.
Brown, Trenton L., to Aluminum Company of America. Automatic setup for machining device. 4,002,102, Cl. 90-15.00R.
Brunetti, Heimo; Schmidt, Andreas; and Rosenberger, Siegfried, to Ciba-Geigy Corporation. Process for the manufacture of acylhydrazines. 4,002,680, Cl. 260-559.00H.
Brunnengraber, Hermann, to Gebr. Hofmann KG. Method and circuit for use in determining unbalance of a rotary body. 4,002,076, Cl. 73-462.000.

Bruno, Edward C. Method and apparatus for packaging goods. 4,002,006, Cl. 53-29.000.

Bruno, Edward G. Combination scaffold and utility platform. 4,002,222, Cl. 182-132.000.

Brusa, Ugo. Process for continuously heating and melting prereduced iron ores. 4,002,465, Cl. 75-11.000.

Bucek, Miroslav: *See—*
Sevcik, Zdenek; Bucek, Miroslav; and Henzl, Jindrich, 4,002,190.

Buchalter, Gilbert. Method of transmitting ultrasonic impulses to surface using transducer coupling agent. 4,002,221, Cl. 181-.500.

Buchalter, Gilbert. Cardiac defibrillator cup. 4,002,239, Cl. 206-484.000.

Buchel, Karl Heinz: *See—*
Meiser, Werner; Kramer, Wolfgang; Buchel, Karl Heinz; and Plempel, Manfred, 4,002,763.

Bucheli, Josef, to Tuflex AG. Expansion anchor sleeve and method of making the same. 4,002,100, Cl. 85-85.000.

Buck, Erville C., to Willamette Valley Company, The. Proportioning systems. 4,002,271, Cl. 222-134.000.

Buckley, Charles O.: *See—*
Bunn, Julian W., Jr.; and Buckley, Charles O., 4,002,552.

Budzich, Tadeusz. Hydrostatic transmission mixed loop system. 4,002,028, Cl. 60-453.000.

Bukowick, Peter A., to Hercules Incorporated. 2-Furaldoximinyl allophanates. 4,002,649, Cl. 260-347.300.

Bullock, David A.: *See—*
Vanlandingham, Harold W.; Boggs, Roger L.; Bullock, David A.; and Maytum, James N., 4,002,090.

Bult, Roelof P., to Cominco Ltd. Stabilization of aluminum arsenide. 4,002,505, Cl. 148-20.300.

Bumber, Roger L. Multi-channel decoding circuit for two-channel audio systems. 4,002,835, Cl. 179-1.0GQ.

Bunda, Tsuchio: *See—*
Toyoda, Eiji; Noguchi, Masaaki; Tanaka, Yukiyasu; Bunda, Tsuchio; and Sumiyoshi, Masaharu, 4,002,151.

Bunn, Julian W., Jr.; and Buckley, Charles O., to Trienco, Inc. Liquid level control system. 4,002,552, Cl. 204-266.000.

Burgbacher, Donald E.: *See—*
Hales, Louis S.; Hamilton, Don R.; Weller, Harry F.; and Burgbacher, Donald E., 4,001,978.

Burgess, Ralph D., Jr. Particulate material distributing assembly. 4,002,251, Cl. 214-17.0CA.

Burroughs Corporation: *See—*
Sims, Dewey M., Jr., 4,002,871.
Sims, Dewey M., Jr., 4,002,879.

Busch, Dieter K., to VDO Adolf Schindling AG. Device for measurement and/or control of temperature. 4,002,924, Cl. 307-117.000.

Busch, Walter: *See—*
Hammer, Klaus-Dieter; Busch, Walter; and Klendauer, Wolfgang, 4,002,710.

Butler, James R.: *See—*
Turner, James E.; and Butler, James R., 4,002,739.

Butler, Walter J.; Barron, Mark B.; and Kurz, Bruno F., deceased (by Kurz-Beerli, Elizabeth, executrix), to General Electric Company. Bucket-brigade delay line having reduced parasitic capacitances and method for making the same. 4,002,513, Cl. 148-187.000.

Byrd, Carlisle O., Jr., to J. T. Thorpe Company. Prefabricated insulating blocks for furnace lining. 4,001,996, Cl. 52-509.000.

Bytzek, Max: *See—*
Hammer, Klaus-Dieter; Klendauer, Wolfgang; and Bytzek, Max, 4,002,485.

C.A.V. Limited: *See—*
Nicholls, Wilfrid Edward Walter; and Lakra, Paul, 4,002,415.

Calderon, Albert. Pollution control of coke ovens. 4,002,537, Cl. 202-248.000.

Cale, Albert Duncan, Jr., to A. H. Robins Company, Incorporated. N-(1-substituted-3-pyrrolidinyl)-4-quinolinecarboxamides. 4,002,757, Cl. 424-258.000.

Calgon Corporation: *See—*
Farley, David E.; and Morgan, Janice Elaine, 4,002,589.

Camco, Incorporated: *See—*
Terral, Ben David, 4,002,203.

Camerman, Philippe Jean Andre Charles; and Hanotier, Jacques Daniel Victor, to Labofina S.A. Process for the oxidation of secondary alcohols into ketones. 4,002,685, Cl. 260-593.00R.

Camerman, Philippe Jean Andre Charles: *See—*
Hanotier, Jacques Daniel Victor; and Camerman, Philippe Jean Andre Charles, 4,002,656.

Cameron, Douglas H.; and Clem, Bryan M., to Minnesota Mining and Manufacturing Company. Magnetic tape cartridge with removable spool. 4,002,238, Cl. 206-408.000.

Campanelli, Tony. Cleaning, polishing, and drying nails by moving them through vibratory troughs. 4,002,488, Cl. 134-7.000.

Campbell, Bernerd E.: *See—*
Mallozzi, Philip J.; Epstein, Harold M.; Applebaum, David C.; Gallagher, William J.; and Campbell, Bernerd E., 4,002,403.

Campbell Industries: *See—*
Jangaard, Sverre, 4,002,377.

Campbell, Ronald P.: *See—*
Ketler, Albert E.; Campbell, Ronald P.; and Shacreaw, George, 4,002,895.

Canada Wire and Cable Limited: *See—*
Paniri, Zvi; and Shakotko, Walter, 4,002,820.

Canon Kabushiki Kaisha: *See—*
Hashimoto, Shigeru; and Ito, Masaharu, 4,003,068.
Hirata, Osamu, 4,003,092.
Sugiura, Yoshinori; Endo, Kiyonobu; Kono, Kimio; and Sato, Hideaki, 4,003,059.

Canter, James Allen, to General Motors Corporation. Thermostat control system for an automatic ice maker. 4,002,041, Cl. 62-137.000.

Cappel, Marie-Luise: *See—*
Frohlich, Alfons; and Cappel, Marie-Luise, 4,002,045.

Capra, Uberto, to Ceccato & C. S.p.A. Vehicle-washing station with scrubbing unit composed of vertically superposed rotary brushes. 4,001,907, Cl. 15-53.00A.

Carbonel, Jack; Grammont, Paul D. A.; and Herbin, Jean E. E., to Diamond Shamrock Corporation. Cation-exchange resins having cross-linked vinyl aromatic polymer matrix with attached amino alkylene phosphonic acid groups, their use, and preparation. 4,002,564, Cl. 210-38.00R.

Carborundum Company, The: *See—*
Marin, Glenn R., 4,002,225.

Cardon, Carlos D.; and Griffone, Lawrence P., to Sperry Rand Corporation. Programmable high pass digital filter of analog signal. 4,002,988, Cl. 328-138.000.

Cardon, Carlos D.; and Griffone, Lawrence P., to Sperry Rand Corporation. Programmable low pass digital filter of analog signal. 4,002,989, Cl. 328-138.000.

Cardpak Incorporated: *See—*
Place, Osmund V.; Hungerford, Philip C., Jr.; and Gereby, John L., 4,002,003.

Cardwell, Paul H.: *See—*
Sandberg, Richard G.; Kane, William S.; and Cardwell, Paul H., 4,002,717.

Carlo Erba S.p.A.: *See—*
Ambrogi, Vittorio; Logemann, Willy; Parenti, Marc Antonio; and Tommasini, Raffaele, 4,002,750.

Carlow, Earl F.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Peddle, Charles; and Wiles, Michael F., 4,003,028.

Carone, Sandra M.: *See—*
Bornstein, Michael; and Carone, Sandra M., 4,002,748.

Carpenter, Donald E.: *See—*
Baimbridge, Charles L.; Minderhout, James R.; Bearman, Robert W.; and Carpenter, Donald E., 4,002,548.

Carpi, Carlo; Dorigotti, Luciano; and Pifferi, Giorgio, to I.S.F. S.p.A. 6-Substituted 3-carbethoxyhydrazinopyridazines. 4,002,753, Cl. 424-250.000.

Cashen, Norton A., to United States of America, Agriculture. Method of producing anhydrous crystalline reaction products of formaldehyde and methyl-, ethyl carbamate. 4,002,668, Cl. 260-482.00C.

Casio Computer Co., Ltd.: *See—*
Kashio, Toshio, 4,003,031.

Cassarino, Frank V., Jr.: *See—*
O'Keefe, David B.; Cassarino, Frank V., Jr.; and Riikonen, Douglas L., 4,003,033.

Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Heinrich, Ernst; Kindler, Horst; and Ribka, Joachim, 4,002,425.

Catalyst Research Corporation: *See—*
Blucher, Richard L., 4,002,498.

Catania, Basilio, to CSELT - Centro Studi e Laboratori Telecomunicazioni SpA. Mixed analog/digital transmission system using radio link and method of operating same. 4,002,982, Cl. 325-39.000.

Caterpillar Tractor Co.: *See—*
Erickson, Rodney R.; Peters, Melvin H.; and McMillan, Daniel L., 4,002,107.
Vanlandingham, Harold W.; Boggs, Roger L.; Bullock, David A.; and Maytum, James N., 4,002,090.
Wilson, Eugene M.; and Girard, William T., 4,001,956.

Catozzo, Leo. Film splicing device. 4,002,522, Cl. 156-506.000.

Cavanaugh, Robert E., Jr.: *See—*
Packard, Lyle E.; Polic, Edward F.; and Cavanaugh, Robert E., Jr., 4,002,909.

Caveney, Jack E., to Panduit Corporation. Fixed dog ladder strap. 4,001,898, Cl. 24-16.0PB.

Cavin, Daniel C., to Shell Oil Company. Timing the deposition of an asphalt plugging material from an asphalt-cationic emulsion. 4,002,204, Cl. 166-294.000.

CEAC of Illinois, Inc.: *See—*
Menninga, Gysbert L., 4,002,952.

CEBAL: *See—*
Gaborieau, Jean-Yves; and Baumann, Bernard, 4,002,516.

Ceccato & C. S.p.A.: *See—*
Capra, Uberto, 4,001,907.

Celanese Corporation: *See—*
Chenevey, Edward Clarence; and Kimmel, Robert Michael, 4,002,426.

Century Time Ltd.: *See—*
Klingenberg, Hans Ulrich, 4,002,020.

Chambley, Phillip W.: *See—*
Norris, Alan H.; and Chambley, Phillip W., 4,002,012.

Champion International Corporation: *See—*
Norris, Alan H.; and Chambley, Phillip W., 4,002,012.
Wright, John T., 4,001,974.

Chan, Harvey T., Jr., to United States of America, Agriculture. Method for removing seeds from papayas. 4,002,774, Cl. 426-484.000.

Chandler, Benson. Wood truss structure with eccentric end support. 4,001,999, Cl. 52-693.000.

Chang, Hsu, to International Business Machines Corporation. Magnetic bubble domain processing apparatus and method. 4,003,037, Cl. 340-174.0TF.

Chang, Ten-Hsiang. Electronic switch for controlling the speed of a motor. 4,002,961, Cl. 318-305.000.

Chang, Yun Feng: *See—*
Labana, Santokh S.; and Chang, Yun Feng, 4,002,699.

Chappell, Ronald George: *See—*
Duncan, Frederic James; and Chappell, Ronald George, 4,002,713.

Chaprnka, Anthony G.: *See—*
Sun, Shan C.; and Chaprnka, Anthony G., 4,002,977.

Charbonnages de France: *See—*
Marcellini, Robert, 4,002,263.

Chase, Peter McGivery: *See—*
Debortoli, George; and Chase, Peter McGivery, 4,002,832.

Chase, William P.; and Holloschutz, Leon. Prefabricated building structure. 4,001,990, Cl. 52-167.000.

Chasens, Bernard, to General Instrument Corporation. Vertical coil for a deflection yoke. 4,003,012, Cl. 335-213.000.

Chaston, Jack Chambers: *See—*
Bourne, Alan Arthur; Chaston, Jack Chambers; and Darling, Alan Sydney, 4,002,503.

Chem. Pharmaz. Fabrik Dr. Herman Thiemann G.m.b.H.: *See—*
Eiden, Fritz; and Schmiz, Claus, 4,002,617.

Chemical Reactor Equipment A/S: *See—*
Olofsen, Oluf Per, 4,002,254.

Chen, Nai Yuen, to Mobil Oil Corporation. Selective production of para-xylene. 4,002,697, Cl. 260-671.00M.

Chenevey, Edward Clarence; and Kimmel, Robert Michael, to Celanese Corporation. Production of stabilized non-burning acrylic fibers and films. 4,002,426, Cl. 8-115.500.

Cheplick, Peter G.: *See—*
MacRae, Donald R.; Gold, Richard G.; Sandall, William R.; Thompson, Charles D.; and Cheplick, Peter G., 4,002,466.

Cherry, Sidney J., to Westinghouse Electric Corporation. Vacuum-type circuit interrupters with condensing shield at a fixed potential relative to the contacts. 4,002,867, Cl. 200-144.00B.

Chevron Research Company: *See—*
Csicsery, Sigmund M., 4,002,578.
DeMay, George B., 4,002,728.
Farnham, Robert A., 4,002,555.
Farrell, Thomas R.; Klett, Robert J.; and Craig, James A., 4,002,565.
Guffy, Joseph C.; Winkler, Robert A.; and Paulson, Marvin H., 4,002,721.
West, James M., 4,002,881.

Chew, Thomas: *See—*
Nye, James Leroy; Barr, Samuel Rothrock; Chew, Thomas; and Steyer, William, 4,002,024.

Chikashige, Kiyoshi. Flash device for a focal plane shutter camera. 4,003,065, Cl. 354-132.000.

Chin, Kenneth Gan Gee, to Lawrence Peska Associates, Inc., a part interest. Board game of the hare and tortoise. 4,002,341, Cl. 273-134.00G.

Ching, Yau-Chau; Hofmann, Allan Michael; and Messerschmitt, David Gavin, to Bell Telephone Laboratories, Incorporated. Data compression using nearly instantaneous companding in a digital speech interpolation system. 4,002,841, Cl. 179-15.0AS.

Chiriac, Ilie: *See—*
Teodorescu, Constantin; Chiriac, Ilie; and Iacob, Ion Stelian, 4,002,110.

Chodnekar, Madhukar Subraya; Loeliger, Peter; Pfiffner, Albert; Schwieter, Ulrich; Suchy, Milos; and Zurfluh, Rene, to Hoffmann-La Roche Inc. Novel benzofuranyl pest retardants. 4,002,647, Cl. 260-346.20R.

Christian, James Vernon: *See—*
Edwards, Joseph Franklin; Brown, Johnny Milton; Christian, James Vernon; and Elkins, Clayton, 4,002,372.

Christiansen, Soren Bent, to F. L. Smidth & Co. Method of burning calcined and uncalcined pulverous raw material and rotary kiln plant therefor. 4,002,420, Cl. 432-14.000.

Chua, H. T.: *See—*
Tsang, Frederick; and Chua, H. T., 4,002,931.

Ciba-Geigy Corporation: *See—*
Allgeier, Hans; and Gagneux, Andre, 4,002,764.
Anner, Georg; and Wieland, Peter, 4,002,614.
Brunetti, Heimo; Schmidt, Andreas; and Rosenberger, Siegfried, 4,002,680.
Dengler, Siegfried; Loew, Peter; Zickendraht, Christian; and Schwander, Hansrudolf, 4,002,619.
Frey, Christoph, 4,002,635.
Habermeier, Jurgen, 4,002,600.
Jager, Horst, 4,002,657.
Karrer, Friedrich; and Farooq, Saleem, 4,002,768.
Sturm, Elmar; and Vogel, Christian, 4,002,461.

Cikotte, Leonard Joseph: *See—*
Nevin, Robert Leland; O'Leary, John Joseph; and Cikotte, Leonard Joseph, 4,002,827.

Ciments Lafarge S.A.: *See—*
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Citizen Watch Co., Ltd.: *See—*
Washimine, Osamu, 4,002,118.

Clarke, Christopher Keith Perry, to Marconi Company Limited, The; and Standard Telephones & Cables Limited. Digital signal transmission. 4,003,020, Cl. 340-146.1AL.

Clauss, Richard John; and Tremmel, Robert Arnold, to Oxy Metal Industries Corporation. Electrodeposition of bright nickel-iron deposits. 4,002,543, Cl. 204-41.000.

Clavin, Edward Albert, to Mid-Continent Pipeline Equipment Co., a division of Harrisburg, Inc. Force maintaining toggles systems. 4,002,050, Cl. 72-466.000.

Clem, Bryan M.: *See—*
Cameron, Douglas H.; and Clem, Bryan M., 4,002,238.

Cleveland Machine Controls, Inc.: *See—*
Reiner, Robert Leopold, 4,002,270.

Cloke, Robert L.: *See—*
Sordello, Frank J.; and Cloke, Robert L., 4,003,000.

Coca-Cola Co., The: *See—*
Harvill, William Andrew, 4,002,215.

Cocci, James Alfred; and Schiff, Maurice L., to United States of America, Navy. PCM synchronization and multiplexing system. 4,002,834, Cl. 178-69.100.

Coenen, Matthias Christian, to Jenaer Glaswerk Schott & Gen. Glass compositions suitable for incorporation into concrete. 4,002,482, Cl. 106-40.00V.

Coffin, Jack Caryl, to RCA Corporation. Photodetector non-responsive to cerenkov radiation. 4,002,901, Cl. 250-211.00R.

Cohen, Neal Ian, to Magid Glove Manufacturing Company, Inc. Paneled dip-coated work glove. 4,001,895, Cl. 2-161.00R.

Cole, Geoffrey Alan: *See—*
Jones, Eric; Padget, John Christopher; and Cole, Geoffrey Alan, 4,002,814.

Colechia, Edward A., to Textron, Inc. Notched head nail having a pair of depending annularly spaced radial abutment ribs and package thereof. 4,002,098, Cl. 85-28.000.

Coleman, Kenneth R.; Steinebach, Hans G.; Waden, H. Werner; and Zamek, Paul, to Colenta American Corporation. Film transport apparatus utilizing rollers to provide a U-path. 4,002,280, Cl. 226-171.000.

Coleman, Richard R., Jr.; and Weber, Helmut E. Compressor-expander rotor as employed with an integral turbo-compressor wave engine. 4,002,414, Cl. 416-223.00A.

Colenta American Corporation: *See—*
Coleman, Kenneth R.; Steinebach, Hans G.; Waden, H. Werner; and Zamek, Paul, 4,002,280.

Colgate-Palmolive Company: *See—*
Gault, Ian Ray, 4,002,732.
Marchesani, Cesare N., 4,002,264.

Colglazier, David E.: *See—*
Larson, Willis A.; and Colglazier, David E., 4,002,923.

Collins, Cecil A.: *See—*
Fisher, Robert C.; and Collins, Cecil A., 4,002,311.

Collins, William J. Device and method for obtaining one or more samples of liquid. 4,002,071, Cl. 73-425.40R.

Collins, William J. Device and method of obtaining a sample of liquid. 4,002,072, Cl. 73-425.600.

Collins, William J. Molten metal sampler. 4,002,073, Cl. 73-425.40R.

Collins, William J. Device and method for obtaining one or more samples of molten metal. 4,002,074, Cl. 73-425.40R.

Colt Industries Operating Corporation: *See—*
Bell, Oliver A., Jr.; and Gilleland, Randall C., 4,002,885.

Comalco Aluminium (Bell Bay) Limited: *See—*
Bainbridge, Ian Frank; and Adam, Colin McLean, 4,002,502.

Combustion Engineering, Inc.: *See—*
Andrea, Christo; Dupen, Clive Frederick George; and Noyes, Richard Croissant, 4,002,529.
Skalka, Clemens John, 4,002,299.

Cominco Ltd.: *See—*
Bult, Roelof P., 4,002,505.

Compagnie Francaise de Raffinage: *See—*
D'Aubigne, Jean Merle; Maurin, Jean; and Weisang, Joseph Edouard, 4,002,687.

Compagnie Industrielle des Piles Electriques "Cipel": *See—*
Fafa, Jean, 4,002,808.

Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
Doussoux, Pierre, 4,002,844.

Conax Corporation: *See—*
Jankowiak, Roman; Okonzak, David M.; and Connell, Maurice W., 4,002,345.

Cone, Eugene J., to PPG Industries, Inc. Glass bead forming nozzles and method. 4,002,447, Cl. 65-21.000.

Cone, Eugene J.: *See—*
Hammel, Joseph J.; and Cone, Eugene J., 4,002,446.

Conley, Robert F., to IMC Chemical Group. Process for bleaching kaolin. 4,002,487, Cl. 106-288.00B.

Connell, Maurice W.: *See—*
Jankowiak, Roman; Okonzak, David M.; and Connell, Maurice W., 4,002,345.

Connon, Frederick L., Jr. Automatic unloading metal pickling rack. 4,002,250, Cl. 214-8.000.

Continental Group, Inc., The: *See—*
Khoury, Nick S., 4,002,262.

Continental Oil Company: *See—*
Satchell, Donald P., Jr., 4,002,556.

Conwell, Esther M.; and Kermisch, Dorian, to Xerox Corporation. Externally controllable miniature lasers. 4,002,998, Cl. 331-94.50C.

Cook, Albert W. Treatment of humans with cholinesterase reactivators. 4,002,760, Cl. 424-263.000.

Cooley, Denton A.: *See—*
Reed, Charles C.; Cooley, Denton A.; and Sharp, Russell G., 4,002,174.

Coop, Jackie A., to Aluminum Company of America. Pry-off closure. 4,002,260, Cl. 215-305.000.

Cooper, Abraham J. Dental restoration jig. 4,001,938, Cl. 32-11.000.

Cordiano, Dominic D.; Kastelic, Joseph D.; and Thomas, Vernon E., to General Electric Company. Single latch snap-lock base for annular fluorescent lamps. 4,002,394, Cl. 339-50.00C.

Corman, Edward M.: *See—*
Balzer, Claude P.; Reiff, Almer A.; and Corman, Edward M., 4,001,991.

Cornell, Paul A.: *See—*
Lawlor, Robert E.; and Cornell, Paul A., 4,001,921.

Corning Glass Works: *See—*
Fehiner, Francis P.; Whitman, Arthur J.; and Young, Peter L., 4,002,545.
Gregory, Jerry L.; and Pitcher, Wayne H., Jr., 4,002,576.
Griffith, James L.; and Spremulli, Paul F., 4,002,448.
Knapp, Warren R.; and West, Richard L., Sr., 4,002,451.
Rice, Dale W., 4,002,274.
Young, Peter L., 4,002,542.

Cotter, Donald, to Field Form, Inc. Metal roofing/siding system. 4,001,995, Cl. 52-460.000.

Coulthard, James Albert, to Kepac, Limited. Screen constructions. 4,001,987, Cl. 52-79.900.

Council of Livestock Protection, Inc.: *See—*
Prince, Ralph P.; and Westervelt, Rudy G., 4,001,915.

Coutarel, Yves, to Intertechnique S.A. Program selection, particularly for liquid scintillation spectrometers. 4,002,908, Cl. 250-328.000.

Craig, James A.: *See—*
Farrell, Thomas R.; Klett, Robert J.; and Craig, James A., 4,002,565.

Cramer, Robert L.; and Mientus, James A., to Bendix Corporation, The. Self-regulating cryostat. 4,002,039, Cl. 62-224.000.

Crawford, Alexander; and Bailey, Alfred J., to Massey-Ferguson Services N.V. Material unloading implements. 4,002,272, Cl. 222-392.000.

Cricchio, Renato; and Arioli, Vittorio, to Gruppo Lepetit S.p.A. Piperazinylimino rifamycins. 4,002,752, Cl. 424-250.000.

Cricchio, Renato; and Arioli, Vittorio, to Gruppo Lepetit S.p.A. Substituted piperazinyliminorifamycins. 4,002,754, Cl. 424-250.000.

Cross, David E., to Smiths Industries Limited. Liquid-measuring apparatus. 4,002,075, Cl. 73-426.000.

Crowle, William G.; and Ostrowsky, Efrem M., to VCA Corporation. Safety cap. 4,002,275, Cl. 222-543.000.

Cruz, Gustavo Joel. Graphic reproduction apparatus. 4,001,941, Cl. 33-1.00K.

CSELT - Centro Studi e Laboratori Telecomunicazioni SpA: *See—*
Catania, Basilio, 4,002,982.

Csicsery, Sigmund M., to Chevron Research Company. Catalyst activation process. 4,002,578, Cl. 252-455.00Z.

Culbertson, Samuel W.: *See—*
Krohn, Duane D.; and Culbertson, Samuel W., 4,001,935.

Cupler, John A., II. Method and apparatus for performing surgery without tissue incision. 4,002,169, Cl. 128-276.000.

Curchack, Herbert D., to United States of America, Army. Rifled soft recovery system. 4,002,064, Cl. 73-167.000.

Curry, John J., to Plastisonics Company, Inc. Child resistant closure. 4,002,258, Cl. 215-206.000.

Cusato, Anthony J., to Henry Mann, Inc. Elastic positioner apparatus for orthodontists. 4,001,940, Cl. 32-40.00R.

Cutler-Hammer, Inc.: *See—*
Brown, Harry W., 4,002,874.
Halbeck, Werner B., 4,002,951.

Czerner, Peter A., to Sperry Rand Corporation. Cutter drive arrangement for an electric dry shaver. 4,001,933, Cl. 30-43.920.

Dail, James Edward, to Bell Telephone Laboratories, Incorporated. Fault isolation in a serial-looped transmission system. 4,002,847, Cl. 179-15.0AL.

Daimler-Benz Aktiengesellschaft: *See—*
Merz, Josef, 4,002,442.
Tank, Eggert; and Pigisch, Franz, 4,001,930.
von Koch, Arwed, 4,002,318.

Daiwa Boseki Kabushiki Kaisha: *See—*
Takeuchi, Tatsuo; Motobayashi, Kozo; and Kamiya, Kazuo, 4,002,305.

Dalla Betta, Ralph A.; Piken, Ann G.; and Shelef, Mordecai, to Ford Motor Company. Methanation catalyst and process of using the same. 4,002,658, Cl. 260-449.00M.

Damgaard-Iversen, Jorgen; Gude, Klaus Erik; Hansen, Ove Emil; Lund, Bjorn; and Petersen, Mogens, to Aktieselskabet Niro Atomizer. Method and apparatus for evaporating liquid. 4,002,524, Cl. 159-4.00B.

Damon, James J., to Ford Motor Company. Resilient bushing. 4,002,327, Cl. 267-57.10A.

Damzog, Bodo: *See—*
Berges, Dietrich; Damzog, Bodo; and Saam, Ulrich, 4,002,015.

Dana Corporation: *See—*
Kestner, Michael A., 4,002,154.

Daniels, Lawrence H., to Kaiser Steel Corporation. Steel wall stud and the wall frame employing the same. 4,001,993, Cl. 52-376.000.

Daniels, Peter J. L.: *See—*
Wright, John J.; Daniels, Peter J. L.; Mallams, Alan K.; and Nagabhushan, Tattanahalli L., 4,002,608.
Wright, John J.; Daniels, Peter J. L.; Mallams, Alan K.; and Nagabhushan, Tattanahalli L., 4,002,742.

Darex Corporation: *See—*
Bernard, Arthur Alexander; and Bernard, Richard Allen, 4,001,975.

Darling, Alan Sydney: *See—*
Bourne, Alan Arthur; Chaston, Jack Chambers; and Darling, Alan Sydney, 4,002,503.

Dart Industries Inc.: *See—*
Steinert, Robert Bruce; and Schuessler, William Arthur, 4,002,813.

da Silva, Herman: *See—*
van Duuren, Henrik Cornelis Anthony; and da Silva, Herman, 4,003,041.

Da Silva Passos, Domicano. Harvester for rice, wheat and similar cereals. 4,002,010, Cl. 56-126.000.

D'Aubigne, Jean Merle; Maurin, Jean; and Weisang, Joseph Edouard, to Compagnie Francaise de Raffinage. Process for the hydroperoxidation of branched alkanes in a plurality of stages, comprising washings between the said stages. 4,002,687, Cl. 260-610.00B.

Daugherty, Kenneth E.; Luker, John P.; Allen, Joseph H.; and Klemm, Waldemar A., to General Portland, Inc. Expansive cement. 4,002,483, Cl. 106-89.000.

Davey, Ernest A.; Mathieu, Norman A.; and Parent, Edward D., to GTE Sylvania Incorporated. Evaporation source. 4,002,880, Cl. 219-275.000.

Davies, David Evan Naunton; and Kingsley, Stuart Alexander. Telecommunication system. 4,002,896, Cl. 250-199.000.

Davis, Charles S.: *See—*
Schwan, Thomas J.; Davis, Charles S.; and Honkomp, Leroy J., 4,002,652.

Davis, Hubert Greenidge: *See—*
Albright, Charles William; and Davis, Hubert Greenidge, 4,002,535.

Davis, Kirk Emerson; and Wierber, Emil Thomas, to Lubrizol Corporation, The. Method of preparing primary aliphatic mercaptans. 4,002,686, Cl. 260-609.00R.

Davis, Ross Alan. Windshield antenna system with resonant element and cooperating resonant conductive edge. 4,003,056, Cl. 343-704.000.

Dawihl, Walther; and Eicke, Walter, to Klockner-Werke AG. Method of and apparatus for transporting of metal fibers. 4,002,464, Cl. 75-.5AA.

Dayco Corporation: *See—*
Waugh, Dale L., 4,002,082.

Dean Products, Inc.: *See—*
Raskin, Walter, 4,002,200.

De Boer, Thijs Johannes: *See—*
Van Houten, Sjouke; and De Boer, Thijs Johannes, 4,002,945.

Debortoli, George; and Chase, Peter McGivery, to Northern Electric Company Limited. Loading coil assemblies for communications cables. 4,002,832, Cl. 178-46.000.

Deepsea Ventures, Inc.: *See—*
Sandberg, Richard G.; Kane, William S.; and Cardwell, Paul H., 4,002,717.

Deering Milliken Research Corporation: *See—*
Klein, Norman E., 4,002,789.

Degen, Peter John; and Lucas, Anthony James, to Minnesota Mining and Manufacturing Company. Sunscreening compositions. 4,002,733, Cl. 424-59.000.

DeGrado, Costabile, to Okonite Company, The. Gas cable with compression type pulling assembly. 4,002,817, Cl. 174-10.000.

Deitch, James C.; and Leistiko, Lawrence F., to Magnetic Controls Company. Printed circuit jack. 4,002,399, Cl. 339-221.00M.

Delarge, Jacques E.; Thunus, Leopold N.; Lapiere, Charles-Leon; and Georges, Andre H., to A. Christiaens Societe Anonyme. Certain pyridine carboxamide derivatives. 4,002,629, Cl. 260-268.00H.

de Lima Castro, Eduardo Neto. Label holder for mail bags and the like. 4,001,957, Cl. 40-10.00R.

De Loucker, Gustaaf: *See—*
Aelterman, Marcel; De Loucker, Gustaaf; Van Bouwel, Leo; Stievenart, Emile; Koninger, Horst; Schausberger, Helmut; Ertl, Franz; Rohr, Horst; and Geyken, Erwin, 4,002,267.

DEMAG, A.G.: *See—*
Spoler, Johannes Gerhard, 4,002,125.

DeMay, George B., to Chevron Research Company. Hydrogen sulfide removal from contaminated sulfur. 4,002,728, Cl. 423-578.00R.

Demmy, Robert C., to RCA Corporation. Shadow mask cathode ray tube shield. 4,002,941, Cl. 313-402.000.

Dendy, Jackie D.: *See—*
Jeffers, Mark A.; and Dendy, Jackie D., 4,002,059.

Dengler, Siegfried; Loew, Peter; Zickendraht, Christian; and Schwander, Hansrudolf, to Ciba-Geigy Corporation. Coumarine dyestuffs of the dispersion series. 4,002,619, Cl. 260-240.00G.

Denham, Keith: *See—*
Bradley, William David; and Denham, Keith, 4,002,099.

den Hollander, Willem, to RCA Corporation. Synchronized and regulated power supply. 4,002,965, Cl. 323-17.000.

DePew, Thomas N.: *See—*
Bell, Ferris Andrew; and DePew, Thomas N., 4,002,126.

Design Systems, Inc.: *See—*
Streander, George W., 4,002,541.

Desio, Frank B., to Illinois Tool Works Inc. Electrical switch housing detachably mountable on a gas valve structure. 4,002,872, Cl. 200-294.000.

DeSoto, Inc.: *See—*
Aeschliman, Eugene, 4,002,831.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Simmersbach, Edmund; and Schaller, Artur, 4,002,434.

Develop KG/Dr. Eisbein and Co.: *See—*
Moser, Kurt; Wegmann, Helmut; and Weigele, Reinhold, 4,002,145.

Diamond Shamrock Corporation: *See—*
Carbonel, Jack; Grammont, Paul D. A.; and Herbin, Jean E. E., 4,002,564.

Dickens, Elmer Douglas, Jr., to B. F. Goodrich Company, The. Smoke retardant vinyl chloride and vinylidene chloride polymer compositions. 4,002,597, Cl. 260-45.75N.

Dickerson, Arthur F., to Hughes Aircraft Company. Power transmission control system. 4,002,950, Cl. 317-16.000.

Dickey-john Corporation: *See—*
Anson, James H., 4,002,937.

Dietrich, Ernst: *See—*
Hoerauf, Werner; Guenther, Ernst; Kissel, Ernst; Valentin, Guenter; and Dietrich, Ernst, 4,002,430.

Dietzgen Corporation: *See—*
Putnam, Dean H., 4,002,142.

Digital Communications Corporation: *See—*
Kaul, Pradman P.; and Kaul, Pradeep, 4,002,845.

DiMatteo, Paul L., to Dynell Electronics Corporation. Arrangement for varying the rate of recording of information. 4,003,027, Cl. 340-172.500.

Dir, Gary A., to Xerox Corporation. Imaging system with latent alignment image. 4,002,404, Cl. 350-160.0LC.

Disney, John A., to Utah State University Foundation. Gas tungsten arc welding electrode. 4,002,878, Cl. 219-121.00P.

Dittmar, Bruce I.: *See—*
Aldrich, Paul E.; Berezin, Gilbert H.; and Dittmar, Bruce I., 4,002,767.

DiTusa, Anthony J.: *See—*
Giori, Francis A.; and DiTusa, Anthony J., 4,002,979.

Dixon, Paul H., to Babette Dixon, Trustee of Paul H. Dixon, Trust dated Jan. 28, 1975. Machine for picking up, transferring, turning and placing parts. 4,002,247, Cl. 214-1.0QA.

Dixon, Paul H., to Babette Dixon, Trustee of Paul H. Dixon, Trust dated Jan. 28, 1975. Apparatus for pneumatically delivering parts. 4,002,265, Cl. 221-210.000.

Dobala, Ronald J. Auto safety flag and holder. 4,002,138, Cl. 116-28.00R.

Dolce, Thomas Joseph, to General Electric Company. Foamed thermoplastic compositions of a linear polyester and an ionically crosslinked copolymer. 4,002,581, Cl. 260-2.50N.

Dolhyj, Serge R.: *See—*
Bremer, Noel J.; Milberger, Ernest C.; and Dolhyj, Serge R., 4,002,650.

Dollat, Michel Paul, to Etablissements A. Chromarat & Cie. Yarn stop motion. 4,002,044, Cl. 66-161.000.

Donaldson, Desmond M., to Borg-Warner Corporation. Multiple fluid stacked plate heat exchanger. 4,002,201, Cl. 165-140.000.

Donjon, Jacques; Grenot, Michel; and Hazan, Jean-Pierre, to U.S. Philips Corporation. Optical image converting relay having an electro-optical element and a photoconductive element. 4,002,902, Cl. 250-213.00R.

Donnelly, William R., to Readi Temp, Inc. Heat transfer package with a collapsible, pleated, frusto-conical, upper wall section. 4,002,235, Cl. 206-219.000.

Dopp, Kip H. Ski clip device. 4,002,349, Cl. 280-11.37A.

Dorigotti, Luciano: *See—*
Carpi, Carlo; Dorigotti, Luciano; and Pifferi, Giorgio, 4,002,753.

Dorn, Edward G. Combined bookrack and book support. 4,002,240, Cl. 211-42.000.

Doty, Verle L., to Kornylak Corporation. Load transfer mechanism and jam preventing controls for a vertical shelf conveyor. 4,002,231, Cl. 198-483.000.

Doussoux, Pierre, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Device for multiplexing N asynchronous digital trains. 4,002,844, Cl. 179-15.0AF.

Dover, Jerry D., to Indian Head Inc. Hot end glass container coating system. 4,002,143, Cl. 118-610.000.

Dow Chemical Company, The: *See—*
Plomer, John J.; Staudacher, Gerald R.; and Roberson, Keith, 4,002,514.
Trepanier, Donald L., 4,002,624.
Trepanier, Donald L., 4,002,625.
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Dresser Industries, Inc.: *See—*
Angehrn, Jorg August, 4,002,063.

Drogen Incorporated: *See—*
Halley, Henry H., Jr., 4,002,119.

Drori, Mordeki. Ventilated back-seat rest particularly for automotive vehicles. 4,002,108, Cl. 98-2.030.

Drori, Mordeki. Self-regulating sprinkler. 4,002,295, Cl. 239-230.000.

Drori, Mordeki. Rotary sprinkler particularly for use with low-energy water jets. 4,002,296, Cl. 239-230.000.

Dubois, Roland; and Bernasconi, Alexandre Antoine, to Les Fabriques d'Assortiments Reunies. Rotary escapement for timepiece. 4,002,021, Cl. 58-117.000.

Duclaux, Daniel; Pontier, Andre J. A.; and Ferret, Georges Paul, to Societe de Vente de l'Aluminium Pechiney. Process and apparatus for collecting the fumes given off during the production of aluminium in an electrolysis cell with a continuous anode. 4,002,551, Cl. 204-247.000.

Duer, Morris J., to General Motors Corporation. Piston pump or motor having internal fluid filter. 4,002,104, Cl. 91-499.000.

Duff, Jerry: *See—*
Beaver, Dennis; Hensley, J. R.; and Duff, Jerry, 4,002,336.

Dulog, Lothar G.: *See—*
Broeckx, Willy P.; and Dulog, Lothar G., 4,002,437.

Dumesnil, Maurice E.; and Schreier, Ulrich, to Technology Glass Corporation. Glass sealed products. 4,002,799, Cl. 428-428.000.

Duncan, Frederic James; and Chappell, Ronald George, to Imperial Chemical Industries Limited. Cementing compositions and concretes and mortars derived therefrom. 4,002,713, Cl. 264-234.000.

Dunlop, Clifford Arthur Allen: *See—*
Henderson, Gary Arthur; and Dunlop, Clifford Arthur Allen, 4,002,771.

Dunn, Robert Brian; and Lee, John Davidson, to Northern Electric Company Limited. Insulation slicing terminal. 4,002,391, Cl. 339-98.000.

Dunphy, Matthew J., to Pyrotector, Incorporated. Optical fire detection system. 4,003,039, Cl. 340-228.00R.

Dupen, Clive Frederick George: *See—*
Andrea, Christo; Dupen, Clive Frederick George; and Noyes, Richard Croissant, 4,002,529.

Du Pont de Nemours, E. I., and Company: *See—*
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Aldrich, Paul E.; Berezin, Gilbert H.; and Dittmar, Bruce I., 4,002,767.
Bayless, John H.; and Arvidson, Harold Carl, 4,002,802.
Bellis, Harold E.; and Booker, Donald E., 4,002,778.
Evans, Robert Franklin, 4,002,400.
Howell, Gary W., 4,002,070.
Johnson, Melvin Harry; and Walker, Calvin Brooks, 4,002,013.
Neumer, John Fred, 4,002,616.
Robinson, Ivan Maxwell, 4,002,646.
Smith, Sanford Byrom, 4,002,424.
Wood, Everitt Franklin, 4,001,981.

Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, to Smith Kline & French Laboratories Limited. Pyridylbutylamino ethylene compounds. 4,002,759, Cl. 424-263.000.

Dyer, Lawrence Dean, to Texas Instruments Incorporated. Dislocation-free growth of silicon semiconductor crystals with <110> orientation. 4,002,523, Cl. 156-617.0SP.

Dynamit Nobel Aktiengesellschaft: *See—*
Kops, Friedrich, 4,002,055.
Nestler, Heinz; Amort, Jurgen; and Plankl, Leo Hans, 4,002,800.

Dynatech Laboratories, Incorporated: *See—*
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Dynell Electronics Corporation: *See—*
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E. J. Brooks Company: *See—*
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E M I Limited: *See—*
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E. R. Squibb & Sons, Inc.: *See—*
Rovnyak, George C., 4,002,749.
Vogt, Berthold Richard, 4,002,639.

Eachus, Joseph J., to Honeywell Information Systems, Inc. Rate independent signalling means. 4,002,833, Cl. 178-66.00R.

Easter, Michael J., to Westinghouse Electric Corporation. Turbine lubrication and emergency gas system. 4,002,224, Cl. 184-6.110.

Eastman Kodak Company: *See—*
Bissonette, Vernon Leon, 4,002,477.
Brauning, Gerhard, 4,003,067.
Edelman, Robert I.; Stockdale, Willis L.; Sylvester, Robert A.; and Zollo, Corrado, 4,002,517.
Galbraith, Floyd Malcolm, Jr., 4,003,062.
Hickok, William Kelsey, 4,003,077.
Ott, Robert J.; and Franke, Hans G., 4,002,475.
Woo, Nea-Yea, 4,003,079.

Eaton Corporation: *See—*
Hantack, Melvin E.; and Frazier, Paul D., 4,002,419.

Eberspacher, J.: *See—*
Loffelhardt, Dietmar, 4,002,026.

Ebner, Theran L.; and Hawkins, Donald W., to Houston Natural Gas Corporation. Transceiver. 4,002,837, Cl. 179-2.0AM.

Eckert, Albin F. Putter pointer. 4,002,343, Cl. 273-163.00R.

Edelman, Robert I.; Stockdale, Willis L.; Sylvester, Robert A.; and Zollo, Corrado, to Eastman Kodak Company. Tacked film roll and method of making same. 4,002,517, Cl. 156-73.400.

Edmo, Torbjorn, to Bispgardens Svets & Smide AB. Piston-cylinder mechanism. 4,002,106, Cl. 92-65.000.

Edwards, John A.: *See—*
Beard, Colin C.; Edwards, John A.; and Fried, John H., 4,002,640.

Edwards, Joseph Franklin; Brown, Johnny Milton; Christian, James Vernon; and Elkins, Clayton, to General Shale Products Corporation. Pulverulent material metering and delivery system and method. 4,002,372, Cl. 302-25.000.

Edwin Cooper & Company Limited: *See—*
Jayne, Gerald John Joseph; and Askew, Herbert Frank, 4,002,568.

Egbers, Gerhard; and Artzt, Peter, to Patentverwertungs-AG der Spinnerei am Uznaberg. Method of making yarns from angora rabbit's-wool and yarns so made. 4,002,019, Cl. 57-140.0BY.

Eggermont, Ludwig Desire Johan, to U.S. Philips Corporation. Digital converter from delta-modulated signals into PCM signals. 4,002,981, Cl. 325-38.00R.

Eggert, Hans-Joachim; Jungnitsch, Georg; Kuehne, Rudi; Waliczek, Walter; and Zenkert, Heinrich, to Siemens Aktiengesellschaft. Housing for electrical, communications and measuring devices. 4,002,955, Cl. 317-120.000.

Eic International Corporation: *See—*
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Eicke, Walter: *See—*
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Eiden, Fritz; and Schmiz, Claus, to Chem. Pharmaz. Fabrik Dr. Her-

man Thiemann G.m.b.H. Hydrodipyrano-phthalazine compounds. 4,002,617, Cl. 260-240.00F.

Eilingsfeld, Heinz: *See—*
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Einar Welins Patenter Kommanditbolag: *See—*
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Eisenhardt, Fred W., to Alloway Manufacturing, Inc. Ditcher. 4,002,206, Cl. 172-90.000.

Ekkelboom, Tjepke Hendrik; and van Stratum, Antonius Johannes Alberta, to U.S. Philips Corporation. Electrode for a discharge lamp. 4,002,940, Cl. 313-346.00R.

Ekzemplyarov, Oleg Nikolaevich: *See—*
Kulbakh, Valter Osvaldovich; Kokushina, Tatyana Mikhailovna; Lagert, Irina Kondratievna; Mikhailets, Georgy Avxentievich; Kholodova, Galina Vasilievna; Ekzemplyarov, Oleg Nikolaevich; Zelmanov, Ruvim Bentsionovich; Sokolov, Leonid Borisovich; Etingov, Evgeny Davidovich; and Lushitskaya, Irina Mikhailovna, 4,002,741.

Electro Networks, Division of Chloride, Inc. N. American Operations: *See—*
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Electro Sciences for Medicine, Inc.: *See—*
Giori, Francis A.; and DiTusa, Anthony J., 4,002,979.

Eley, James M.; and Smith, Fred T., to Tyrone Hydraulics, Inc.; and Sargent Industries, Inc., part interest to each. Multiple pump control system. 4,002,027, Cl. 60-430.000.

Eli Lilly and Company: *See—*
Benefiel, Robert Lee, 4,002,628.
Bornstein, Michael; and Carone, Sandra M., 4,002,748.

Elias, Jerry D.: *See—*
Gamber, William V., 4,002,338.

Elkay Electronics Ltd.: *See—*
Klebanoff, Leonard; and Binnee, Donald, 4,002,996.

Elkina, Evgenia Dmitrievna: *See—*
Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Bilyavsky, Anatoly Arkadievich; Gorodnitsyna, Vera Evdokimovna; Elkina, Evgenia Dmitrievna; Manaenkov, Valery Ivanovich; Polyanskaya, Ljudmila Nikolaevna; Sorokin, Jury Leonidovich; Taran, Anatoly Zakharovich; and Fadeev, Evgeny Alexeevich, 4,002,444.

Elkins, Clayton: *See—*
Edwards, Joseph Franklin; Brown, Johnny Milton; Christian, James Vernon; and Elkins, Clayton, 4,002,372.

Elkins, Raymon Kelsick; and Hutson, Richard Neil, to Hutson Corporation, The. Unloading ramp assembly. 4,001,979, Cl. 51-163.200.

Emery Industries, Inc.: *See—*
Loeb, Barry L.; and Witsken, Kenneth J., 4,002,688.

Emhart Industries, Inc.: *See—*
Rowe, George E., deceased, 4,002,454.

EMI Limited: *See—*
Hounsfield, Godfrey Newbold, 4,002,911.
LeMay, Christopher Archibald Gordon, 4,002,913.
Mayo, Bernard Joseph, 4,002,917.

Emmel, Ludwig: *See—*
Stahler, Gerhard; Emmel, Ludwig; and Bonin, Werner, 4,002,743.

Emmett, John Colin: *See—*
Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, 4,002,759.

Enderle, Norman Edward. Hand tool for removing a movable member from a confined space adjacent a fixed member. 4,001,927, Cl. 29-267.000.

Endo, Hajime: *See—*
Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; Endo, Hajime; and Kiyama, Nobuo, 4,002,037.

Endo, Kiyonobu: *See—*
Sugiura, Yoshinori; Endo, Kiyonobu; Kono, Kimio; and Sato, Hideaki, 4,003,059.

Energy Transformation Corporation: *See—*
Toesca, Rene A. M, 4,002,157.

English Card Clothing Company Limited, The: *See—*
Grimshaw, Keith; and Taylor, Roy, 4,001,916.

Engraph, Inc.: *See—*
Moseley, Ronald E.; and Stewart, Henry G., 4,002,519.

Entenmann, Charles E., to Entenmann's Bakery, Inc. Baking and packaging system. 4,002,773, Cl. 426-302.000.

Entenmann's Bakery, Inc.: *See—*
Entenmann, Charles E., 4,002,773.

Entreprise Generale de Chauffage Industriel Pillard: *See—*
Pillard, Jean-Claude L., 4,002,297.

Entwistle, Geoffrey S., to TRW Inc. Color image data recorder. 4,003,058, Cl. 346-1.000.

Environmental Devices Corporation: *See—*
Brainard, David M.; and Brainard, Edward C., II, 4,002,175.

Epstein, Harold M.: *See—*
Mallozzi, Philip J.; Epstein, Harold M.; Applebaum, David C.; Gallagher, William J.; and Campbell, Bernerd E., 4,002,403.

Erickson, David K.: *See—*
Erickson, Wallace A.; and Erickson, David K., 4,001,909.

Erickson, Dennis C.; and Massey, Gail A., to United States of America, Interior. Electro-optic measurement of voltage on high-voltage power lines. 4,002,975, Cl. 324-96.000.

Erickson, Harold L.; and Weaver, Wayne S., to Quick Rip Corporation. Metal saw. 4,002,094, Cl. 83-471.300.

Erickson, Rodney R.; Peters, Melvin H.; and McMillan, Daniel L., to Caterpillar Tractor Co. Disposable fluid actuator. 4,002,107, Cl. 92-163.000.

Erickson, Wallace A.; and Erickson, David K., to Wallace A. Erickson & Company. Child's toothbrush having a whistle. 4,001,909, Cl. 15-105.000.

Erie Manufacturing Company: *See—*
Konczal, Harry C., 4,002,185.

Eriksson, Bolik Anders Gottfrid, to Aktiebolaget Electrolux. Vacuum cleaner device. 4,001,912, Cl. 15-339.000.

Eriksson, Mats Erik, to Hiab-Foco Aktiebolag. Vehicle cranes. 4,002,242, Cl. 212-8.00R.

Eriksson, Nils Tage; Jacobsson, Rune William; and Sundstrom, Ingvar Georg, to Telefonaktiebolaget L M Ericsson. Radar function testing apparatus. 4,003,055, Cl. 343-17.700.

Eriksson, Stig-Lennart, to Seco Tools AB. Cutting tool. 4,001,925, Cl. 29-96.000.

Ershova, Ljubov Valentinovna: *See—*
Smirnov, Svetoslav Georgievich; Gorbacheva, Nadezhda Semenovna; Ershova, Ljubov Valentinovna; Ljubimova, Nina Andreevna; Pestova, Galina Grigorievna; Selekhova, Nina Pavlovna; Smirnova, Margarita Ilinichna; Tiflov, Alexandr Vladimirovich; and Fomina, Nina Alexeevna, 4,002,550.

Ertl, Franz: *See—*
Aelterman, Marcel; De Loucker, Gustaaf; Van Bouwel, Leo; Stievenart, Emile; Koninger, Horst; Schausberger, Helmut; Ertl, Franz; Rohr, Horst; and Geyken, Erwin, 4,002,267.

ESB Incorporated: *See—*
Vengrofski, Frank A., 4,002,494.

Escott, Robert Milton, to Midrex Corporation. Packed bed heat exchanger. 4,002,422, Cl. 432-99.000.

Eshelman, Cheston Lee. Back motion tire buffer. 4,002,364, Cl. 293-67.000.

Esparza, Jose O., to Shell Oil Company. Removal of coatings by rotating chain flails. 4,002,491, Cl. 134-6.000.

Etablissements A. Chromarat & Cie: *See—*
Dollat, Michel Paul, 4,002,044.

Ethyl Corporation: *See—*
Shepherd, Lawrence H., Jr., 4,002,691.

Etingov, Evgeny Davidovich: *See—*
Kulbakh, Valter Osvaldovich; Kokushina, Tatyana Mikhailovna; Lagert, Irina Kondratievna; Mikhailets, Georgy Avxentievich; Kholodova, Galina Vasilievna; Ekzemplyarov, Oleg Nikolaevich; Zelmanov, Ruvim Bentsionovich; Sokolov, Leonid Borisovich; Etingov, Evgeny Davidovich; and Lushitskaya, Irina Mikhailovna, 4,002,741.

Evans, Robert Franklin, to Du Pont de Nemours, E. I., and Company. Electrical connector. 4,002,400, Cl. 339-258.00R.

Exxon Research and Engineering Company: *See—*
Borge, Magne; and Lode, Torger, 4,002,554.
Brice, John C.; and Peruyero, Jose M. A., 4,002,432.
Feldman, Nicholas, 4,002,558.
Rao, Bhaskara M. L., 4,002,492.
Wheelock, Kenneth S.; and Say, Geoffrey R., 4,002,720.

F. L. Smidth & Co.: *See—*
Christiansen, Soren Bent, 4,002,420.

Fadeev, Evgeny Alexeevich: *See—*
Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Bilyavsky, Anatoly Arkadievich; Gorodnitsyna, Vera Evdokimovna; Elkina, Evgenia Dmitrievna; Manaenkov, Valery Ivanovich; Polyanskaya, Ljudmila Nikolaevna; Sorokin, Jury Leonidovich; Taran, Anatoly Zakharovich; and Fadeev, Evgeny Alexeevich, 4,002,444.

Fafa, Jean, to Compagnie Industrielle des Piles Electriques "Cipel". Electrochemical cell. 4,002,808, Cl. 429-157.000.

Fahrbach, Gerhard; Seiler, Erhard; and Stein, Dieter, to BASF Aktiengesellschaft. Graft copolymers based on methyl methacrylate polymers. 4,002,703, Cl. 260-901.000.

Fairchild Camera and Instrument Corporation: *See—*
Au, Alexander, 4,003,034.

Falchle, Jorg: *See—*
Wanner, Karl; Falchle, Jorg; Schmid, Wolfgang; Bleicher, Manfred; Hahner, Reinhard; and Kleine, Werner, Jr., 4,002,347.

Falk, David C. Horticultural device. 4,002,205, Cl. 172-15.000.

Farley, David E.; and Morgan, Janice Elaine, to Calgon Corporation. Preparation of water soluble segmented polymers. 4,002,589, Cl. 260-29.6WQ.

Farnham, Robert A., to Chevron Research Company. Hydrocarbon reforming process. 4,002,555, Cl. 208-80.000.

Farooq, Saleem: *See—*
Karrer, Friedrich; and Farooq, Saleem, 4,002,768.

Farrell, Thomas R.; Klett, Robert J.; and Craig, James A., to Chevron Research Company. Waste-water process. 4,002,565, Cl. 210-60.000.

Fasse, Wolfgang G. Breast cancer detection training device. 4,001,951, Cl. 35-17.000.

Favrot, Paul, to Landis-Gendron S.A. Loader assembly. 4,001,983, Cl. 51-215.00R.

Fawkes, David Melville; and Leng, John Lindley, to Imperial Chemical Industries Limited. Azo dyestuff including a 1,3 or 1,4-benzodioxan ring structure fused to a thiazole ring. 4,002,604, Cl. 260-155.000.

Fecko, Francis D., to A. L. Garber Company, The. "Take-one" display card. 4,001,958, Cl. 40-124.100.

Federal-Mogul Corporation: *See—*
LeBrasse, Gordon J.; and Gallatin, Victor, 4,002,472.
Sarnes, Myron C.; and Haynie, Robert N., 4,002,471.

Fehiner, Francis P.; Whitman, Arthur J.; and Young, Peter L., to Corning Glass Works. Method of forming a thin film capacitor. 4,002,545, Cl. 204-192.000.

Feighery, James M., to Tex Del Inc. Carpet roll-up mechanism. 4,002,308, Cl. 242-66.000.

Feldman, Mark I., to Johnson & Johnson. Diaper having tab fastener with central flap. 4,002,172, Cl. 128-284.000.

Feldman, Nicholas, to Exxon Research and Engineering Company. Removing water haze from distillate fuels. 4,002,558, Cl. 208-188.000.

Fender, C. Leo. Tone control circuit. 4,002,994, Cl. 330-107.000.

Fennell, S. Reed, to Aluminum Company of America. Annular eddy current test coil with magnetic laminations adjacent a limited circumferential extent. 4,002,967, Cl. 324-40.000.

Fenoglio, David J., to Standard Oil Company (Indiana). Bis-(1,4-dihydronaphtho)[2,3-c; 2,3-f]1,2,5-trithiepane. 4,002,644, Cl. 260-327.00B.

Fensholt, Edward C.: *See*—
Hanisch, Alfred H.; and Fensholt, Edward C., 4,002,398.

Fenton, Sidney Desmond, to Storey Brothers and Company Limited. Manufacture of vehicle seats. 4,002,520, Cl. 156-246.000.

Ferrand, Michel, to Societe d'Etudes de Machines Thermiques. Machine crank-shaft with improved dynamic balance ratio. 4,002,087, Cl. 74-595.000.

Ferret, Georges Paul: *See*—
Duclaux, Daniel; Pontier, Andre J. A.; and Ferret, Georges Paul, 4,002,551.

Ferro Corporation: *See*—
Baskin, Yehuda, 4,002,592.

Feterl, Leon G., to SOS Consolidated, Inc. Bale handling apparatus. 4,002,147, Cl. 119-60.000.

Fetterman, Miles Q., to PPG Industries, Inc. Scorch retardants for rubber reinforced with siliceous pigment and mercapto-type coupling agent. 4,002,594, Cl. 260-42.370.

Field Form, Inc.: *See*—
Cotter, Donald, 4,001,995.

Fields, Ellis K.: *See*—
Puskas, Imre; and Fields, Ellis K., 4,002,648.

Filby, Evan E., to United States of America, Energy Research and Development Administration. Method of recycling lithium borate to lithium borohydride through methyl borate. 4,002,726, Cl. 423-287.000.

Financial Mining - Industrial and Shipping Corporation: *See*—
Nestoridis, Antonios, 4,002,463.

Fincham, Sydney Robert; and Munday, Richard John, to Tingey and Company (Engineers) Limited. Recovery of a commodity from a sachet or bag containing the commodity. 4,002,255, Cl. 214-305.000.

Fink, David O.; and McCrary, Stanley R., to United States of America, Navy. Quick disconnect coupling. 4,002,186, Cl. 137-614.030.

Fiore, Joseph V.; Kelly, T. Kenneth; and Nellen, William J., to AMF Incorporated. Foams and sponge sheet for cigar manufacture. 4,002,178, Cl. 131-15.00R.

Firearms Import and Export Corporation: *See*—
Bernkrant, Keith David, 4,002,223.

Firmenich & Cie: *See*—
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,002,793.

Fischer, Artur. Connector for use with structural-foam elements. 4,001,965, Cl. 46-23.000.

Fischer, Artur. Apparatus for fixing an object to a low-strength support structure. 4,001,989, Cl. 52-127.000.

Fischer, Earl L., to Victor Comptometer Corporation. Air gun. 4,002,156, Cl. 124-67.000.

Fischer, Ernst, to Gebr. Bohler & Co. AG. Casting mold assembly. 4,002,317, Cl. 249-79.000.

Fischer, Peter; Schmidt, Bruno; Langer, Rolf; and Trommer, Gunter, to VEB Spinnereimaschinenbau. Open end spinning apparatus. 4,002,016, Cl. 57-58.950.

Fisher, Alan H.: *See*—
Michalski, Raymond J.; and Fisher, Alan H., 4,002,490.

Fisher, Evan D., to United States of America, Army. Dual channel redundant fuze. 4,002,123, Cl. 102-70.20G.

Fisher, Robert C.; and Collins, Cecil A. Belt tension eliminator for seat belt system. 4,002,311, Cl. 242-107.700.

Fitzgerald, John Henry; Guarino, Robert Anthony; and Green, Herbert, to United Technologies Corporation. Expanded range gate moving target indicator. 4,003,051, Cl. 343-7.700.

Flair, Henry J., to Illinois Tool Works Inc. Variable involute disc gauge. 4,001,943, Cl. 33-174.00R.

Flambeau Paper Company: *See*—
Baierl, Kenneth W., 4,002,525.

Flament, Ivon: *See*—
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,002,793.

Fleissner, Heinz, to Vepa AG. Process for the production of textile material lengths containing bonding agents. 4,002,783, Cl. 427-335.000.

Fleming, Joseph. Organic conversion system. 4,002,438, Cl. 48-76.000.

Flexsteel Industries, Inc.: *See*—
Quakenbush, Howard M., 4,001,901.

Flodin, Benny: *See*—
Hedqvist, Tore; Gunnarsson, Einar; and Flodin, Benny, 4,002,489.

Fock, Jurgen; and Holtschmidt, Ulrich, to Th. Goldschmidt AG. Process for making carrier sheets containing hardenable polyester resins. 4,002,781, Cl. 427-340.000.

Fomina, Nina Alexeevna: *See*—
Smirnov, Svetoslav Georgievich; Gorbacheva, Nadezhda Semenovna; Ershova, Ljubov Valentinovna; Ljubimova, Nina Andreevna; Pestova, Galina Grigorievna; Selekhova, Nina Pavlovna; Smirnova, Margarita Ilinichna; Tiflov, Alexandr Vladimirovich; and Fomina, Nina Alexeevna, 4,002,550.

Ford Motor Company: *See*—
Dalla Betta, Ralph A.; Piken, Ann G.; and Shelef, Mordecai, 4,002,658.
Damon, James J., 4,002,327.
Gupta, Nirmal K.; and Ludwig, Frank A., 4,002,806.
Labana, Santokh S.; and Chang, Yun Feng, 4,002,699.
Ludwig, Frank A., 4,002,807.

Foster, Phillip W., to Lee Blacksmith, Inc. Adjustable mounting for auxiliary farm implement. 4,002,413, Cl. 403-234.000.

Francis, David N., to Ansul Company, The. Dynamic fire simulator and trainer. 4,001,949, Cl. 35-10.000.

Frank, Gerhard; and Roth, Ernst, to Siegenia-Frank KG. Window hardware. 4,002,360, Cl. 292-336.300.

Franke, Hans G.: *See*—
Ott, Robert J.; and Franke, Hans G., 4,002,475.

Frankel, Charles; and Skobel, Max, to M S Laboratories Inc. Jewelry clasp. 4,001,923, Cl. 24-230.0SL.

Franklin, David W. Sweeping apparatus for coupling to a motorized vehicle. 4,001,908, Cl. 15-83.000.

Frazier, Paul D.: *See*—
Hantack, Melvin E.; and Frazier, Paul D., 4,002,419.

Frederick, Roger A.; and Reichard, Thomas E., to Monsanto. Apparatus and method for orienting monocrystalline material for sawing. 4,002,410, Cl. 356-31.000.

Freedland Industries Corporation: *See*—
Gobush, Michael; and Freedland, Richard, 4,001,971.

Freedland, Richard: *See*—
Gobush, Michael; and Freedland, Richard, 4,001,971.

Frey, Christoph, to Ciba-Geigy Corporation. Isoindolinone compounds useful in preparing heavy metal containing pigments. 4,002,635, Cl. 260-304.00R.

Frick, Hans Dieter: *See*—
Ganser, Friedrich; Hammer, Thomas; Frick, Hans Dieter; Viehrig, Wolfgang; Ritter, Karl Heinz; Kwiatkowski, Wolfgang; Osegowitsch, Viktor; Glass, Josef; and Laar, Erwin, 4,002,310.

Fridinger, Tomas L., to Minnesota Mining and Manufacturing Company. Perfluoroalkanesulfonate esters. 4,002,661, Cl. 260-456.00R.

Fried, John H.: *See*—
Beard, Colin C.; Edwards, John A.; and Fried, John H., 4,002,640.

Fritsche, Peter, to BASF Farben & Fasern Aktiengesellschaft. Method for the production of coatings. 4,002,582, Cl. 260-4.00R.

Frohlich, Alfons; and Cappel, Marie-Luise, to Opti-Holding AG. Warp-knit support tape for slide-fastener stringer. 4,002,045, Cl. 66-202.000.

Frostad, Lars: *See*—
Stelljes, Charles R.; and Frostad, Lars, 4,001,937.

Fugere, Albert Lee; and Kelly, Michael Joseph. Protective gaiter. 4,001,953, Cl. 36-2.00R.

Fuji Photo Film Co., Ltd.: *See*—
Akashi, Goro; Fujiyama, Masaaki; Yamaguchi, Nobutaka; Takayama, Satoru; and Sasazawa, Koji, 4,002,804.
Hinata, Masanao; Mihara, Yuji; Ohi, Reiichi; Adachi, Keiichi; and Sato, Akira, 4,002,480.
Ogata, Yasuhiro; and Matsukawa, Hiroharu, 4,002,060.
Shirahata, Ryuji; Kitamoto, Tatsuji; and Suzuki, Masaaki, 4,002,546.
Suzuki, Nobuo; Noguchi, Yasuhiro; and Masuda, Takao, 4,002,479.

Fujieda, Hiroshi: *See*—
Kiuchi, Mitsuyuki; Kusunoki, Shigeru; Fujieda, Hiroshi; Amagami, Keizo; and Toyooka, Tadao, 4,002,875.

Fujikura Cable Works, Ltd., The: *See*—
Tanaka, Shigenobu; Nishikawa, Seiichi; and Ishikawa, Seiji, 4,002,011.

Fujitsu Ltd.: *See*—
Takagi, Sadaaki, 4,003,071.

Fujiyama, Masaaki: *See*—
Akashi, Goro; Fujiyama, Masaaki; Yamaguchi, Nobutaka; Takayama, Satoru; and Sasazawa, Koji, 4,002,804.

Fukutake, Katsuhiko: *See*—
Suemasa, Hideo; Honda, Kazuyoshi; Fukutake, Katsuhiko; and Yoda, Kenichi, 4,002,929.

Fukuzaki, Hiroshi; Niki, Masao; Yokota, Yukinaga; and Furukawa, Jun-ichi, to Kao Soap Co., Ltd. Process for preparing a liquid resinous composition and the composition. 4,002,700, Cl. 260-872.000.

Fulghum, David A.; Powers, David A.; Lathrop, Ross M.; and Swallow, Robert W., to International Harvester Company. Air cooled tractor carburetor. 4,002,217, Cl. 180-54.00A.

Fumoto, Teruo, to Matsushita Electric Industrial Co., Ltd. Color television system employing index signal generating means. 4,003,082, Cl. 358-69.000.

Funke, Helmut: *See*—
Jooss, Helmut; Brammer, Hartmut; and Funke, Helmut, 4,002,868.

Furukawa, Jun-ichi: *See*—
Fukuzaki, Hiroshi; Niki, Masao; Yokota, Yukinaga; and Furukawa, Jun-ichi, 4,002,700.

G. D. Searle & Co.: *See*—
Miyano, Masateru, 4,002,663.
Yen, Chung H., 4,002,618.

Gaborieau, Jean-Yves; and Baumann, Bernard, to CEBAL. Hermetic closure. 4,002,516, Cl. 156-69.000.

Gaboury, Ronald F. Process for joining electrodes and product resulting therefrom. 4,002,942, Cl. 314-60.000.

GAF Corporation: *See—*
Hort, Eugene V., 4,002,694.
Russo, Robert Victor, 4,002,580.

Gagneux, Andre: *See—*
Allgeier, Hans; and Gagneux, Andre, 4,002,764.

Gakken Co. Ltd.: *See—*
Amma, Michito, 4,002,408.

Galbraith, Floyd Malcolm, Jr., to Eastman Kodak Company. Camera filter positioning apparatus. 4,003,062, Cl. 354-21.000.

Gallagher, William J.: *See—*
Mallozzi, Philip J.; Epstein, Harold M.; Applebaum, David C.; Gallagher, William J.; and Campbell, Bernerd E., 4,002,403.

Gallatin, Victor: *See—*
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Galvin, Thomas J., to ICI United States Inc. Hydroxyethyl cellulose thickened hydrazine and substituted hydrazines. 4,002,515, Cl. 149-36.000.

Gamber, William V., to Elias, Jerry D. Amusement game device. 4,002,338, Cl. 273-122.00A.

Ganellin, Charon Robin: *See—*
Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, 4,002,759.

Gangneux, Philippe Yves Edouard, to Produits Chimiques Ugine Kuhlmann. Coloration of linear polymers by co-polycondensation with pigments. 4,002,591, Cl. 260-37.00N.

Ganser, Friedrich; Hammer, Thomas; Frick, Hans Dieter; Viehrig, Wolfgang; Ritter, Karl Heinz; Kwiatkowski, Wolfgang; Osegowitsch, Viktor; Glass, Josef; and Laar, Erwin, to AGFA-Gevaert, A.G. Reel for photographing paper or the like. 4,002,310, Cl. 242-71.800.

Gardella, Libero A.; and Kesler, Helen, to Arnar-Stone Laboratories, Inc. Gelatin-encapsulated digoxin solutions and method of preparing the same. 4,002,718, Cl. 424-37.000.

Gardiner, Frank J.: *See—*
Brown, John Buchanan; and Gardiner, Frank J., 4,002,830.

Gardner, Gilbert MacLean. Audio signal distributor. 4,002,836, Cl. 179-1.0GQ.

Gariazzo, Michael C., to United States of America, Navy. Digital data recording and decoding. 4,003,083, Cl. 360-29.000.

Gary, Wardell; and Taylor, Glenn R., to Westinghouse Electric Corporation. Long delay acceleration module for an overload relay system. 4,002,948, Cl. 317-13.00A.

Gasparrini, Charles Robert: *See—*
MacPhee, John M.; and Gasparrini, Charles Robert, 4,002,047.

Gaston County Dyeing Machine Company: *See—*
Aurich, Christoph W.; and Turner, James Keith, 4,001,945.

Gault, Ian Ray, to Colgate-Palmolive Company. Speckle particle for dentifrice. 4,002,732, Cl. 424-49.000.

Gautschi, Fritz: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,002,793.

Gavrilin, Evgeny Fedorovich: *See—*
Zhupakhin, Anatoly Dmitrievich; Prokoshev, Gennady Ivanovich; Karavashkin, Boris Konstantinovich; Shved, Felix Iosifovich; Maksutov, Rashat Faskheevich; Gavrilin, Evgeny Fedorovich; Mushenkov, Vasily Andreevich; Sergeev, Anatoly Borisovich; Shkapa, Alexandr Fedorovich; and Zhivichkin, Lev Alexandrovich, 4,002,816.

Gebr. Bohler & Co. AG: *See—*
Fischer, Ernst, 4,002,317.

Gebr. Hofmann KG: *See—*
Brunnengraber, Hermann, 4,002,076.

Geiser, Milton L., to Kerr Glass Manufacturing Corporation. Safety closure. 4,002,259, Cl. 215-216.000.

Gele, Pierre J.: *See—*
Laprade, Bernard R.; Laprade, Xavier J.; and Gele, Pierre J., 4,002,704.

Gendron, George J.: *See—*
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General American Transportation Corporation: *See—*
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General Atomic Company: *See—*
Peszeszer, Endre F., 4,002,304.

General Electric Company: *See—*
Butler, Walter J.; Barron, Mark B.; and Kurz, Bruno F., deceased, 4,002,513.
Cordiano, Dominic D.; Kastelic, Joseph D.; and Thomas, Vernon E., 4,002,394.
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Hales, Louis S.; Hamilton, Don R.; Weller, Harry F.; and Burgbacher, Donald E., 4,001,978.
Hesler, Joseph P.; and Korzekwa, Samuel M., 4,002,999.
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Katchman, Arthur, 4,002,701.
Konrad, Charles Edward; and Brown, Lynnie Barry, 4,002,972.
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Rice, Frank L.; and Wilson, Arthur C., 4,001,973.
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General Electric Company Limited, The: *See—*
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General Foods Corporation: *See—*
Haas, Gerhard J., 4,002,772.
Wankier, Bartley Norman, 4,002,770.

General Foods Limited: *See—*
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General Instrument Corporation: *See—*
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General Motors Corporation: *See—*
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Giese, Edwin G. Audio program switching apparatus. 4,002,858, Cl. 179-100.10C.

Gill, Walter L. Kitchen utensil. 4,001,904, Cl. 7-14.600.

Gilleland, Randall C.: *See—*
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Giori, Francis A.; and DiTusa, Anthony J., to Electro Sciences for Medicine, Inc. Pulse comparator. 4,002,979, Cl. 324-181.000.

Girard, William T.: *See—*
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te Nijenhuis, Bauke, 4,002,572.

Givens, James A. Improved stabilized survival raft. 4,001,905, Cl. 9-11.00A.

GKN Sankey Limited: *See—*
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Glass, Josef: *See—*
Ganser, Friedrich; Hammer, Thomas; Frick, Hans Dieter; Viehrig, Wolfgang; Ritter, Karl Heinz; Kwiatkowski, Wolfgang; Osegowitsch, Viktor; Glass, Josef; and Laar, Erwin, 4,002,310.

Glicken, Harry. Balanced component operative with an associated shaft for relative positioning movement therebetween. 4,002,083, Cl. 74-459.000.

Gobush, Michael; and Freedland, Richard, to Freedland Industries Corporation. Unit window regulator assembly. 4,001,971, Cl. 49-352.000.

Goddard, Terrence P., to Teledyne McCormick Selph, an operating division of Teledyne Industries, Inc. Bis-guanidinium decahydrodecaborate and a process for its preparation. 4,002,681, Cl. 260-564.00D.

Gold, Richard G.: *See—*
MacRae, Donald R.; Gold, Richard G.; Sandall, William R.; Thompson, Charles D.; and Cheplick, Peter G., 4,002,466.

Goldberg, Bruce S.: *See—*
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Golding, Cyril George; and Leonowicz, Eugene, to GKN Sankey Limited. Dispense head for liquid containers. 4,002,273, Cl. 222-400.700.

Goldman, Irving M.: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,002,793.

Goldstein, Gideon. Ubiquitous immunopoietic polypeptide (UBIP) and methods. 4,002,602, Cl. 260-112.50R.

Goldstein, Gideon; and Schlesinger, David H. Thymopoietin II and therapeutic use thereof. 4,002,740, Cl. 424-177.000.

Goldstone, Bertram J., to Raytheon Company. Method of compensating for imbalances in a quadrature demodulator. 4,003,054, Cl. 343-17.700.

Goodyear Tire & Rubber Company, The: *See—*
Hoppstock, Frederic H., 4,002,696.
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Gorbacheva, Nadezhda Semenovna: *See—*
Smirnov, Svetoslav Georgievich; Gorbacheva, Nadezhda Semenovna; Ershova, Ljubov Valentinovna; Ljubimova, Nina Andreevna; Pestova, Galina Grigorievna; Selekhova, Nina Pavlovna; Smirnova, Margarita Ilinichna; Tiflov, Alexandr Vladimirovich; and Fomina, Nina Alexeevna, 4,002,550.

Gordon, Bernard M., to Gordon Engineering Company. Temperature compensation technique. 4,002,964, Cl. 323-16.000.

Gordon Engineering Company: *See—*
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Gorodnitsyna, Vera Evdokimovna: *See—*
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Gorton, Earl M.; and McGreevy, Robert E., to PPG Industries, Inc. Process for making tetrachloroethylene. 4,002,695, Cl. 260-654.00D.

Goser, Karl; and Pomper, Michael, to Siemens Aktiengesellschaft. Process for transmitting signals between two chips with high-speed complementary MOS circuits. 4,002,928, Cl. 307-251.000.

Gossling, Ernst-Gunther: *See—*
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Gotoh, Hideyuki. Rainbow phenomenon developing device. 4,002,333, Cl. 272-8.00D.

Gould, Bert B., to MB Associates. Microjet fuse. 4,002,122, Cl. 102-70.20A.

Gould Inc.: *See—*
Grasson, John Louis, 4,002,008.
Hakarine, Duane D., 4,002,495.

Gourlia, Jean-Paul: *See—*
Bordet, Jacques; and Gourlia, Jean-Paul, 4,002,052.

Graentzel, Alfred. Apparatus for the irradiation of fluids. 4,002,918, Cl. 250-431.000.

Graham, James A., to Lord Corporation. Epoxy resin compositions from glycidyl derivatives of aminophenols cured with tetracarboxylic dianhydrides. 4,002,599, Cl. 260-47.0EA.

Graham, Roy R., to PPG Industries, Inc. Method of forming and sizing glass fibers. 4,002,445, Cl. 65-3.00C.

Grammont, Paul D. A.: *See—*
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Granberg, Elof. Adjustment means. 4,002,089, Cl. 76-37.000.

Grant, Charles A.; and Saylors, Charles C., to Grant's Textiles, Incorporated. Bear down system for yarn handling machine. 4,002,014, Cl. 57-54.000.

Grantham, Frederick W. Automatic article sorting apparatus. 4,002,560, Cl. 209-73.000.

Grant's Textiles, Incorporated: *See—*
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Grasson, John Louis, to Gould Inc. Compression packaging method and apparatus. 4,002,008, Cl. 53-167.000.

Gray, Lew T.: *See—*
Bennett, Richard J.; Gray, Lew T.; and Levy, Dale F., 4,002,412.

Green, Evert S. Soil irrigation system and method. 4,001,968, Cl. 47-80.000.

Green, Herbert: *See—*
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Greenspan, Marshall: *See—*
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Gregory, Jerry L.; and Pitcher, Wayne H., Jr., to Corning Glass Works. Enzyme carrier regeneration. 4,002,576, Cl. 252-415.000.

Grenci, Carl A. Method and means for volumetric expansion testing. 4,002,054, Cl. 73-37.000.

Grendahl, Russell S. Rotary picture frame. 4,001,959, Cl. 40-152.100.

Grenot, Michel: *See—*
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Grier, John D.: *See—*
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Griffin, Robert K.; and Ober, Birch A., to Sierra Tool Company. Cutting tip reseater. 4,001,982, Cl. 51-211.00R.

Griffith, James L.; and Spremulli, Paul F., to Corning Glass Works. Method and apparatus for determining the elevation of the fusion interface in an electric glass melting furnace. 4,002,448, Cl. 65-29.000.

Griffone, Lawrence P.: *See—*
Cardon, Carlos D.; and Griffone, Lawrence P., 4,002,988.
Cardon, Carlos D.; and Griffone, Lawrence P., 4,002,989.

Grimshaw, Keith; and Taylor, Roy, to English Card Clothing Company Limited, The. Feed mechanisms for fiber processing machines. 4,001,916, Cl. 19-96.000.

Gross, Albert, to Kulzer & Co. GmbH. Tooth-filling material based on synthetic plastics material. 4,001,939, Cl. 32-15.000.

Gross, Albert; and Schaefer, Roland, to Kulzer & Co. GmbH. Hydroxy group containing diesters of acrylic acid. 4,002,669, Cl. 260-486.00B.

Grossmann, Marcel; and Hochreuter, Richard, to Sandoz Ltd. Organic compound. 4,002,785, Cl. 427-389.000.

Grous, Philip P.: *See—*
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Grubbs, Harvey J.: *See—*
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Grun, Gustav, to Luco-Technic AG. Arrangement for mixing and treating powdered and granular material. 4,002,323, Cl. 259-8.000.

Gruppo Lepetit S.p.A.: *See—*
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Cricchio, Renato; and Arioli, Vittorio, 4,002,754.

GTE Laboratories Incorporated: *See—*
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GTE Sylvania Incorporated: *See—*
Davey, Ernest A.; Mathieu, Norman A.; and Parent, Edward D., 4,002,880.
Kotler, Frederick; and Zlotek, David A., 4,002,849.

Guarino, Robert Anthony: *See—*
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Gude, Klaus Erik: *See—*
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Guenther, Ernst: *See—*
Hoerauf, Werner; Guenther, Ernst; Kissel, Ernst; Valentin, Guenter; and Dietrich, Ernst, 4,002,430.

Guffy, Joseph C.; Winkler, Robert A.; and Paulson, Marvin H., to Chevron Research Company. Process improvement in the absorption of acid gas from a feed gas. 4,002,721, Cl. 423-232.000.

Gullick Dobson Limited: *See—*
Jeffrey, Ian Campbell; and Stevenson, James Gray, 4,002,036.

Gunnarsson, Einar: *See—*
Hedqvist, Tore; Gunnarsson, Einar; and Flodin, Benny, 4,002,489.

Gupta, Nirmal K.; and Ludwig, Frank A., to Ford Motor Company. Secondary battery or cell. 4,002,806, Cl. 429-104.000.

Gussow, Sidney S.: *See—*
United States of America, National Aeronautics and Space Administration; Wallace, Gabriel R.; Salter, William E.; Weathers, Glenn D.; and Gussow, Sidney S., 4,003,084.

Guttinger, Manfred, to Sandco Ltd. Hydraulic dual-belt press and control. 4,002,114, Cl. 100-49.000.

H. L. Blachford Limited: *See—*
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Haas, Gerhard J., to General Foods Corporation. Method of increasing the permeability of cellular materials. 4,002,772, Cl. 426-281.000.

Habault, Robert: *See—*
Barbe, Gerard; Habault, Robert; and Tamet, Jean-Louis, 4,002,795.

Haberer, Jean-Paul, to Aimants Ugimag S.A. Composition for permanent magnets of the family "rare earths-transition metals" and process for producing such a magnet. 4,002,508, Cl. 148-31.570.

Habermeier, Jurgen, to Ciba-Geigy Corporation. Linear copolyesters based on terephthalic acid and/or isophthalic acid, a process for their manufacture and their use. 4,002,600, Cl. 260-75.00N.

Hacker, Heinz; and Helwig, Ernst, to Siemens Aktiengesellschaft. Lubricant for wires with enameled or lacquered insulation. 4,002,797, Cl. 428-378.000.

Haeberlin, Allen L. Multichannel digital synthesizer and modulator. 4,003,003, Cl. 332-11.00R.

Hafner, Emanuel: *See—*
Meyr, Heini; Mey, Hansjurg; Nenadal, Zdenek; Tschanz, Markus; Vogel, Eberhard W.; and Hafner, Emanuel, 4,002,842.

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Hagen, Werner: *See—*
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Hager, Clarence H., to Modern Suspension Systems, Inc. Vehicle coupling apparatus. 4,002,352, Cl. 280-408.000.

Hahner, Reinhard: *See—*
Wanner, Karl; Falchle, Jorg; Schmid, Wolfgang; Bleicher, Manfred; Hahner, Reinhard; and Kleine, Werner, Jr., 4,002,347.

Hajek, Manfred; and Wagner, Kuno, to Bayer Aktiengesellschaft. Urethane oxazolidines. 4,002,601, Cl. 260-77.5AT.

Hakarine, Duane D., to Gould Inc. Explosion-proof vent barrel for a battery. 4,002,495, Cl. 429-87.000.

Halbeck, Werner B., to Cutler-Hammer, Inc. Electrical receptacle mounted ground fault interrupter with automatic insertion testing. 4,002,951, Cl. 317-18.00D.

Halcon International, Inc.: *See—*
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Naglieri, Anthony N.; and Rizkalla, Nabil, 4,002,678.

Hales, Louis S.; Hamilton, Don R.; Weller, Harry F.; and Burgbacher, Donald E., to General Electric Company. Apparatus for shaping the edge of a blade element. 4,001,978, Cl. 51-100.00R.

Hall, Anna Cobb: *See—*
Hall, John O.; and Hall, Anna Cobb, 4,001,902.

Hall, John O.; and Hall, Anna Cobb. Suspended bed and shelter. 4,001,902, Cl. 5-121.000.

Hall, William A. Breathing protector boot for impactor tools. 4,002,079, Cl. 74-18.200.

Halley, Henry H., Jr., to Drogen Incorporated. Method for in situ assembly of charge for controlled shooting of wells. 4,002,119, Cl. 102-21.000.

Hamilton, Don R.: *See—*
Hales, Louis S.; Hamilton, Don R.; Weller, Harry F.; and Burgbacher, Donald E., 4,001,978.

Hamilton, Harold E.; Pastorek, Paul V.; Hagedorn, Floyd T.; and Revells, Robert G., to Libbey-Owens-Ford Company. Method of and apparatus for bending glass sheets to relatively sharp angles. 4,002,450, Cl. 65-107.000.

Hammel, Joseph J.; and Cone, Eugene J., to PPG Industries, Inc. Glass bead forming method. 4,002,446, Cl. 65-21.000.

Hammer, Klaus-Dieter; Klendauer, Wolfgang; and Bytzek, Max, to

Hoechst Aktiengesellschaft. Process for the production of thermoplastic synthetic materials of chemically modified protein and plastic shaping materials of chemically modified protein and a chemical plasticizer. 4,002,485, Cl. 106-136.000.

Hammer, Klaus-Dieter; Busch, Walter; and Klendauer, Wolfgang, to Hoechst Aktiengesellschaft. Process for the production of shaped articles of plastic material composed of chemically modified protein. 4,002,710, Cl. 264-183.000.

Hammer, Klaus Dieter; and Klendauer, Wolfgang, to Hoechst Aktiengesellschaft. Process for the production of a plasticized shaped body from a cellulose derivative. 4,002,712, Cl. 264-194.000.

Hammer, Thomas: *See*—
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Hammes, Robert B. Accessory serving as life saving aid. 4,002,366, Cl. 294-26.000.

Hamsley, Minton W. Fish dart. 4,001,963, Cl. 43-6.000.

Hanisch, Alfred H.; and Fensholt, Edward C., to Allen-Bradley Company. Terminal block rack. 4,002,398, Cl. 339-198.0GA.

Hanks, Albert, to Phifer Wire Products, Inc. Woven shade screen. 4,002,188, Cl. 139-420.00R.

Hannart, Jean Alfred Alphonse Joseph, to Omnium Chimique Societe Anonyme. Novel compounds: N-disubstituted amino-ethyl esters of raubasine of the general formula. 4,002,633, Cl. 260-293.530.

Hanotier, Jacques Daniel Victor; and Camerman, Philippe Jean Andre Charles, to Labofina S.A. Process for the selective oxidation of paraffinic hydrocarbons. 4,002,656, Cl. 260-406.000.

Hanotier, Jacques Daniel Victor: *See*—
Camerman, Philippe Jean Andre Charles; and Hanotier, Jacques Daniel Victor, 4,002,685.

Hansen, A. Boyd; and Reynolds, Gordon S., to Sorenson Research Co., Inc. Anticoagulant delivery means for aspiration wand. 4,002,170, Cl. 128-276.000.

Hansen, Ove Emil: *See*—
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Hanson, William J.: *See*—
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Hantack, Melvin E.; and Frazier, Paul D., to Eaton Corporation. Direct burner ignition system. 4,002,419, Cl. 431-67.000.

Harbauer, Paul W., to Owens-Illinois, Inc. Ball type dispensing package. 4,002,411, Cl. 401-213.000.

Harcuba, Siegfried. Pressure force generator for machine tools. 4,002,030, Cl. 60-581.000.

Hardesty, Edwin Charles, to Western Electric Company, Inc. Electrical connecting devices for terminating cords. 4,002,392, Cl. 339-99.00R.

Harding, Brian, to Parkinson Cowan GWB Limited. Grate assembly for a boiler. 4,002,148, Cl. 122-149.000.

Harned, John L.; and Herrick, Donald F., to General Motors Corporation. Engine and engine spark timing control with knock limiting etc. 4,002,155, Cl. 123-148.00E.

Hartman, Frederick Anthony; Kretschmar, Herbert Charles; and Tofe, Andrew John, to Procter & Gamble Company, The. Radionuclide carriers. 4,002,730, Cl. 424-1.000.

Hartmann, Max, to Brown Boveri-Sulzer Turbomaschinen Aktiengesellschaft. Stationary power-generating plant. 4,002,023, Cl. 60-39.310.

Hartung, Sigurd: *See*—
Braden, Rudolf; Knupfer, Hans; and Hartung, Sigurd, 4,002,673.

Harvill, William Andrew, to Coca-Cola Co., The. Portable weigh apparatus for measuring liquid volume. 4,002,215, Cl. 177-146.000.

Hashimoto, Shigeru; and Ito, Masaharu, to Canon Kabushiki Kaisha. Extension tube for use in close-up photography. 4,003,068, Cl. 354-286.000.

Hashino, Yasuo: *See*—
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Hasler AG: *See*—
Meyr, Heini; Mey, Hansjurg; Nenadal, Zdenek; Tschanz, Markus; Vogel, Eberhard W.; and Hafner, Emanuel, 4,002,842.

Haszeldine, Robert Neville; and Rowland, Ronald, to Pennwalt Corporation. Process for insertion of hexafluoropropene at the aliphatic carbon-hydrogen bond of a polyolefin. 4,002,810, Cl. 526-22.000.

Hatridge, Charles L. Thermal cover. 4,002,257, Cl. 215-13.00A.

Haugsjaa, Paul O.: *See*—
McNeill, William H.; Haugsjaa, Paul O.; Lech, Joseph M.; and Regan, Robert J., 4,002,944.
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Hawera Probst Kommanditgesellschaft Hartmetall-Werkzeugfabrik Ravensburgh: *See*—
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Hawkins, David William, to Biorex Laboratories, Limited. Glycyrrhetinic acid derivatives. 4,002,655, Cl. 260-404.500.

Hawkins, Donald W.: *See*—
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Hay, Robert B. Workpiece manipulating devices. 4,001,903, Cl. 7-1.00M.

Hayakawa, Noboru, to Nishihara Environmental Sanitation Research Corporation Ltd. Method and apparatus for measuring density of suspension. 4,002,053, Cl. 73-32.00R.

Hayashi, Hisao: *See*—
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Hayashi, Izuo: *See*—
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Hayden, Rodney, to TRW Inc. Electromechanical switching device. 4,003,011, Cl. 335-196.000.

Haynie, Robert N.: *See*—
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Hazan, Jean-Pierre: *See*—
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Hazelett, Robert William; and Wood, John Frederick Barry, to Hazelett Strip-Casting Corporation. Continuous casting apparatus wherein the temperature of the flexible casting belts in twin-belt machines is controllably elevated prior to contact with the molten metal. 4,002,197, Cl. 164-250.000.

Hazelett Strip-Casting Corporation: *See*—
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Heberlein Maschinenfabrik AG: *See*—
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Hechtfischer, Gustav: *See*—
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Hedqvist, Tore; Gunnarsson, Einar; and Flodin, Benny, to Nyby Bruk AB. Method of pickling metallic material. 4,002,489, Cl. 134-28.000.

Heimala, Seppo Olavi; Hyvarinen, Olli Viljo Juhani; Kinnunen, Jorma Pentti Eenokki; and Tiitinen, Heikki Aukusti, to Outokumpu Oy. Hydrometallurgical process for the recovery of valuable components from the anode slime produced in the electrolytical refining of copper. 4,002,544, Cl. 204-109.000.

Heinrich, Ernst; Kindler, Horst; and Ribka, Joachim, to Cassella Farbwerke Mainkur Aktiengesellschaft. Water-insoluble monoazo dyestuffs. 4,002,425, Cl. 8-41.00C.

Heisler, Harold. Punch press transfer mechanism. 4,002,093, Cl. 83-154.000.

Helda, Robert W.; and Geyer, Harry J., to Motorola, Inc. Integrated circuit device employing metal frame means with preformed conductor means. 4,003,073, Cl. 357-70.000.

Heller, Milton David: *See*—
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Helwig, Ernst: *See*—
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Henderson, Gary Arthur; and Dunlop, Clifford Arthur Allen, to General Foods Limited. Process for preparing a dry, flowable sugar/fat component and whippable dessert composition. 4,002,771, Cl. 426-103.000.

Hendrick Manufacturing Company: *See*—
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Hendy, Brian Norman, to Imperial Chemical Industries Limited. Production of uniform copolymer of acrylonitrile and aromatic olefines. 4,002,811, Cl. 526-59.000.

Hendy, Brian Norman, to Imperial Chemical Industries Limited. Production of uniform copolymer of acrylonitrile and aromatic olefines. 4,002,812, Cl. 526-59.000.

Henkel & Cie G.m.b.H.: *See*—
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Henry Mann, Inc.: *See*—
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Hensley, J. R.: *See*—
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Henzl, Jindrich: *See*—
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Herbin, Jean E. E.: *See*—
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Hercules Incorporated: *See*—
Bukowick, Peter A., 4,002,649.
Jones, Marlene J., 4,002,593.

Herfeld, Friedrich W. Apparatus for mixing powdery or granulated materials. 4,002,325, Cl. 259-23.000.

Herlacher, Richard Eugene, to International Telephone and Telegraph Corporation. Telephone circuit to eliminate use of a hold button. 4,002,857, Cl. 179-99.000.

Herrick, Donald F.: *See*—
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Herrick, Franklin Willard: *See*—
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Herrick, Wallace D., to Bissell Inc. Rotary shaver with shear plate rotation preventing means. 4,001,932, Cl. 30-43.500.

Herrmann, Horst: *See*—
Radeloff, Christian; and Herrmann, Horst, 4,002,506.
Radeloff, Christian; and Herrmann, Horst, 4,002,507.

Herz, Rudolf, to Siemens Aktiengesellschaft. Relay station in a telecommunications transmission system. 4,002,980, Cl. 325-3.000.

Hesler, Joseph P.; and Korzekwa, Samuel M., to General Electric Company. Static inverter with controlled core saturation. 4,002,999, Cl. 331-113.00A.

Heye, Hermann: *See*—
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Hiab-Foco Aktiebolag: *See*—
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Hickok, William Kelsey, to Eastman Kodak Company. Method and apparatus for cancelling chrominance artifacts. 4,003,077, Cl. 358-4.000.

Higuchi, Takeru; Bodor, Nicolae S.; and Kuo, Yu-Neng, to Interx Research Corporation. Useful pro-drug forms of theophylline. 4,002,756, Cl. 424-253.000.

Hilbrands, Jan Willem, to Maschinenfabrik Koppern & Co., KG. Method for determining the behavior of a shock absorber of a motor

vehicle arranged in the wheel suspension and a jig for performing the method. 4,002,051, Cl. 73-11.000.

Hildon, Anthony MacDonald: *See—*
King, Ian Robert; and Hildon, Anthony MacDonald, 4,002,693.

Hilgers, Horst, to Hoechst Aktiengesellschaft. Method and apparatus for producing a developer medium for diazotype materials. 4,003,069, Cl. 354-299.000.

Hilliard, John Joseph; Mullan, Philip Joseph; and Rosenbaum, Walter Steven, to International Business Machines Corporation. Alphabetic character word upper/lower case print convention apparatus and method. 4,003,025, Cl. 340-146.30S.

Hilsum, Cyril; and Shanks, Ian Alexander, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Display systems with controlled color filtering. 4,003,081, Cl. 358-64.000.

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Hinds, James J.; and Stepenske, Lawrence D., to National Can Corporation. Apparatus for detecting imperfections on the wall of cylindrical containers. 4,002,966, Cl. 324-37.000.

Hirata, Osamu, to Canon Kabushiki Kaisha. Reading or writing head positioning device. 4,003,092, Cl. 360-109.000.

Hirohashi, Toshiyuki: *See—*
Yamamoto, Hisao; Inaba, Shigeho; Okamoto, Tadashi; Hirohashi, Toshiyuki; Ishizumi, Kikuo; Yamamoto, Michihiro; Maruyama, Isamu; Mori, Kazuo; and Kobayashi, Tsuyoshi, 4,002,611.

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Hirokane, Tadashi: *See—*
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 4,002,549.

Hitachi, Ltd.: *See—*
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Quadbeck-Seeger, Hans-Juergen; and Hoch, Helmut, 4,002,675.

Hochreuter, Richard: *See—*
Grossmann, Marcel; and Hochreuter, Richard, 4,002,785.

Hodge, Joel W. Newspaper delivery tube insert. 4,002,291, Cl. 232-17.000.

Hodogaya Chemical Co., Ltd.: *See—*
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Hoechst Aktiengesellschaft: *See—*
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Hammer, Klaus-Dieter; Klendauer, Wolfgang; and Bytzek, Max, 4,002,485.
Hammer, Klaus-Dieter; Busch, Walter; and Klendauer, Wolfgang, 4,002,710.
Hammer, Klaus Dieter; and Klendauer, Wolfgang, 4,002,712.
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Ische, Friedrich; and Spietschka, Ernst, 4,002,642.
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Papenfuhs, Theodor; and Troster, Helmut, 4,002,630.
Riegler, Ernst; Kron, Heinrich; and Bittner, Klaus-Jurgen, 4,001,914.
Sahm, Wilfried; Schinzel, Erich; and Rosch, Gunter, 4,002,423.
Schlafer, Ludwig; and Hoyer, Ernst, 4,002,606.
Stahler, Gerhard; Emmel, Ludwig; and Bonin, Werner, 4,002,743.

Hoenigmann, Gustave, to Acme Steel Door Corporation. Automatic feed mechanism for power brake or the like. 4,002,332, Cl. 271-11.000.

Hoerauf, Werner; Guenther, Ernst; Kissel, Ernst; Valentin, Guenter; and Dietrich, Ernst, to BASF Aktiengesellschaft. Extraction tube for polyamides. 4,002,430, Cl. 23-270.00R.

Hofacker, David A., to Minnesota Mining and Manufacturing Company. Controlled release capsules. 4,002,458, Cl. 71-27.000.

Hoffman, Charles Robert; and Lattin, William Walter, to Motorola, Inc. Complementary field effect transistor sense amplifier for one transistor per bit ram cell. 4,003,035, Cl. 340-173.0FF.

Hoffmann-La Roche Inc.: *See—*
Chodnekar, Madhukar Subraya; Loeliger, Peter; Pfiffner, Albert; Schwieter, Ulrich; Suchy, Milos; and Zurfluh, Rene, 4,002,647.

Hofmann, Allan Michael: *See—*
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Hohenschutz, Heinz: *See—*
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Holloway, Caswell Francis, Jr., to Holloway Corporation, The. Modular laboratory bench assembly. 4,002,383, Cl. 312-209.000.

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Holly, Kenneth: *See—*
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Holson Company, The: *See—*
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Holson, Sheldon, to Holson Company, The. Photo album cover with framed insert. 4,001,960, Cl. 40-159.000.

Holst, Preben Lindholm: *See—*
Solli, Hauk; Klemmensen, Per Dausell; Holst, Preben Lindholm; and Madsen, Hans Berg, 4,002,615.

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Holtzman, Barry L., to Westinghouse Electric Corporation. Arcing stacked plate nonlinear resistor for voltage limiter applications such as series capacitor protection. 4,002,947, Cl. 317-12.00A.

Homeyer, Bernhard: *See—*
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Honda, Kazuyoshi: *See—*
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Honda, Kuraji. Aqua-planing vehicle. 4,002,134, Cl. 114-271.000.

Hone, Vernon R. Double pull drawer. 4,002,385, Cl. 312-286.000.

Honeywell Inc.: *See—*
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Honeywell Information Systems, Inc.: *See—*
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Honjo, Katsuhiko: *See—*
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Honkomp, Leroy J.: *See—*
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Hoobery, Joseph J. Garage door structure. 4,001,969, Cl. 49-95.000.

Hooker Chemicals & Plastics Corporation: *See—*
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Hooker, Rea Ferdinand. Polyhedral annular structures, and blanks therefor. 4,001,964, Cl. 46-1.00L.

Hopkins, Ethan C., to American Optical Corporation. Apparatus for making fused fiber energy-conducting devices. 4,002,452, Cl. 65-152.000.

Hoppstock, Frederic H., to Goodyear Tire & Rubber Company, The. Oxidative dehydrogenation of olefins over a high activity cobalt-molybdate catalyst. 4,002,696, Cl. 260-669.00R.

Hori, Michimasa; and Aizawa, Takeshi, to Matsushita Electric Industrial Co., Ltd. Blower. 4,002,109, Cl. 98-32.000.

Hornung, Friedrich: *See—*
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Horowitz, Charles, to Sloan Valve Company. Trailer air distribution valve. 4,002,374, Cl. 303-29.000.

Horstmann, Harald: *See—*
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Hort, Eugene V., to GAF Corporation. Ethynylation catalyst and process for producing alkynols. 4,002,694, Cl. 260-635.00Y.

Horton, Napoleon L.: *See—*
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Horvat, George T. Electrical vehicle. 4,002,218, Cl. 180-65.0DD.

Hoshi, Yoshikazu, to Hitachi, Ltd. Fuel injection control apparatus. 4,002,152, Cl. 123-32.0EA.

Hounsfield, Godfrey Newbold, to EMI Limited. Data acquisition in tomography. 4,002,911, Cl. 250-360.000.

Houston Engineering Research Corporation: *See—*
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Houston Natural Gas Corporation: *See—*
Ebner, Theran L.; and Hawkins, Donald W., 4,002,837.

Howard, Robert W.; and Rose, Desmond K., to Palmer-Shile Company. Beam construction and method of manufacture. 4,002,000, Cl. 52-729.000.

Howe, David G., to United States of America, Navy. Multifilament superconductors. 4,002,504, Cl. 148-11.50R.

Howell, Gary W., to Du Pont de Nemours, E. I., and Company. Sample injection system. 4,002,070, Cl. 73-422.0GC.

Hoyer-Ellefsen, Sigurd, to Servo Corporation of America. Self-cleaning label for automatic object identification system. 4,002,889, Cl. 235-61.12N.

Hoyer, Ernst: *See—*
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Huebsch, Donald L.; and Paulos, Louis B. Fail-safe safety cut-off valve for a fluid well. 4,002,202, Cl. 166-65.00M.

Huet, Joel, to Societe Dilumelt, The. Method for continuously mixing a powder in a liquid. 4,002,324, Cl. 259-9.000.

Hughes Aircraft Company: *See—*
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Moyer, Norman E., 4,002,926.
Zaslav, Harold, 4,002,932.

Hughes, Gordon Alan; and Smith, Herchel, to Smith, Herchel. Synthesis of gon-4-enes. 4,002,746, Cl. 424-243.000.

Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; Endo, Hajime; and Kiyama, Nobuo, to Taiiheiyo Engineering Incorporated. Self-advancing support for use in the pit of coal or metal mine. 4,002,037, Cl. 61-45.00D.
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Place, Osmund V.; Hungerford, Philip C., Jr.; and Gereby, John L., 4,002,003.
Hunter, Patrick L., to North Electric Company. Converter circuit and method having fast responding current balance and limiting. 4,002,963, Cl. 321-18.000.
Huppertz, Andreas; Schultz, Peter; and Maertens, Dieter, to Bayer Aktiengesellschaft. Process for the preparation of dihydroxyanthraquinones. 4,002,654, Cl. 260-383.000.
Huret, Jacques: *See—*
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Huret, Roger; and Huret, Jacques. Derailleur gear for a bicycle. 4,002,080, Cl. 74-217.00B.
Hurko, Bohdan, to General Electric Company. Glass-ceramic plate with multiple coil film heaters. 4,002,883, Cl. 219-543.000.
Hurwitz, Mathew. Prefabricated pre-hung combination storm and screen door and method for installing the same. 4,001,972, Cl. 49-380.000.
Hutchinson, Florence M., executrix: *See—*
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Hutchinson, William Milton, deceased (by Hutchinson, Florence M., executrix), to Phillips Petroleum Company. Azeotropes of 1,2-dichloro-1,1,2-trifluoroethane. 4,002,573, Cl. 252-171.000.
Hutchison, John Grear, to W. R. Grace & Co. Autosynchronous optical scanning and recording laser system with fiber optic light detection. 4,002,829, Cl. 358-286.000.
Hutson Corporation, The: *See—*
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ICI United States Inc.: *See—*
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Iemenschot, Johannes Andreas, to U.S. Philips Corporation. Playback apparatus, in particular, video player, for playing round records provided with information tracks. 4,002,826, Cl. 358-128.000.
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Inaba, Hideya; Onizuka, Shigenori; and Kamino, Yasumi, to Hitachi Shipbuilding and Engineering Co., Ltd. Method of removal of nitrogen oxides. 4,002,723, Cl. 423-239.000.
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Yamamoto, Michihiro; Morooka, Shigeaki; Koshiba, Masao; Inaba, Shigeho; and Yamamoto, Hisao, 4,002,755.
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Inamoto, Yoshiaki; Ikeda, Hiroshi; Takaishi, Naotake; and Tsuchihashi, Kiyoshi, to Kao Soap Co., Ltd. 4-Homoisotwistane-3-carboxylic acid. 4,002,674, Cl. 260-514.00G.
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Ische, Friedrich; and Spietschka, Ernst, to Hoechst Aktiengesellschaft. Process for the preparation of polyhalo copper phthalocyanines. 4,002,642, Cl. 260-314.500.
Ishigaki, Yukinobu: *See—*
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Jackson, Andrew Dudly, Jr. Exerciser and roller massage device. 4,002,163, Cl. 128-57.000.
Jacobs, James W., to General Motors Corporation. Refrigerator food conditioning appliance. 4,002,199, Cl. 165-61.000.

Jacobsson, Rune William: *See*—
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Jager, Horst, to Ciba-Geigy Corporation. Perfluoroalkylalkylcarboxylic acids, process for their manufacture and their use. 4,002,657, Cl. 260-408.000.

Jahnke, Richard E., to Minnesota Mining and Manufacturing Company. Test form for use with a test scoring apparatus. 4,002,888, Cl. 235-61.12N.

James, John R. Automotive body protective apparatus. 4,002,363, Cl. 293-62.000.

Jamin, Guillaume Ward, to Imperial Chemical Industries Limited. Textile printing apparatus. 4,002,046, Cl. 68-5.00C.

Jangaard, Sverre, to Campbell Industries. Sealed bearing for load carrying booms. 4,002,377, Cl. 308-36.100.

Jankowiak, Roman; Okonzak, David M.; and Connell, Maurice W., to Conax Corporation. Seal assembly sequentially providing spaced seal zones. 4,002,345, Cl. 277-110.000.

Jansen, Hans Robert. Underground electrical reticulation systems and transformers therefor. 4,002,920, Cl. 307-17.000.

Japan Carlit Co., Ltd., The: *See*—
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Japan Steel Works Ltd.: *See*—
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Jayne, Gerald John Joseph; and Askew, Herbert Frank, to Edwin Cooper & Company Limited. Lubricating oil compositions. 4,002,568, Cl. 252-46.700.

Jeffers, Mark A.; and Dendy, Jackie D., to Standard Oil Company. Apparatus for manipulating corrosion coupons and the like. 4,002,059, Cl. 73-86.000.

Jeffrey, Ian Campbell; and Stevenson, James Gray, to Gullick Dobson Limited. Mine roof supports. 4,002,036, Cl. 61-45.00D.

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Jenne, Fredrick Benjamin, to American Micro-Systems, Inc. Single IGFET memory cell with buried storage element. 4,003,036, Cl. 340-173.00R.

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Johnson, Alan W.; and Rosebery, Gerald, to International Development Research Center. Germination factors. 4,002,459, Cl. 71-88.000.

Johnson, Allan S., to Tapmatic Corporation. Safety release device useful in tapping attachments. 4,002,348, Cl. 279-75.000.

Johnson, Cleland H., to United States of America, Energy Research and Development Administration. Electrostatic lens to focus an ion beam to uniform density. 4,002,912, Cl. 250-396.00R.

Johnson, Curtis D.; and Weidner, Hal E., to United States of America, Army. Round counter. 4,001,961, Cl. 42-1.00E.

Johnson, Edwin L. Quick-disconnect buckle. 4,001,920, Cl. 24-75.000.

Johnson, Edwin Samuel; and Seely, John Hunter, to Abbott Laboratories. Treatment of specified neoplasias. 4,002,738, Cl. 424-177.000.

Johnson, Homer R.: *See*—
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Johnson, Melvin Harry; and Walker, Calvin Brooks, to Du Pont de Nemours, E. I., and Company. Process and apparatus. 4,002,013, Cl. 57-22.000.

Johnson, Philip C., to Revere Copper and Brass, Incorporated. Emergency exit latch. 4,003,047, Cl. 340-274.00R.

Johnson, Willard Lewis. Wash section for air-cleaning device. 4,002,441, Cl. 55-226.000.

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Johnston, Daniel U., to General Motors Corporation. Accelerator control assembly. 4,002,085, Cl. 74-513.000.

Jones, Eric; Padget, John Christopher; and Cole, Geoffrey Alan, to Imperial Chemical Industries Limited. Polymerization process. 4,002,814, Cl. 526-154.000.

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Kamyr, Inc.: *See*—
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Kani, Masakatsu: *See*—
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Mizutani, Hiroshi; Tokiwa, Fumikatsu; Imamura, Tetsuya; and Sakurada, Toshiro, 4,002,579.

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Kesler, Helen: *See—*
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Kimmel, Robert Michael: *See—*
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Kingsley, Stuart Alexander: *See—*
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Heimala, Seppo Olavi; Hyvarinen, Olli Viljo Juhani; Kinnunen, Jorma Pentti Eenokki; and Tiitinen, Heikki Aukusti, 4,002,544.

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Kissel, Ernst: *See—*
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Klar, Irwin; Rock, Erwin H.; and Rochussen, Arthur W., to American Electromedics Corporation. Automatic means for tympanometric testing. 4,002,161, Cl. 128-2.00Z.

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Klein, Gerhart P., to P. R. Mallory & Co., Inc. Method of making an anode. 4,002,473, Cl. 75-211.000.

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Klupt, Carle D. Food container. 4,002,288, Cl. 229-39.00R.

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Knowles, James, to Schmitt, Jack N. Apparatus for forming trusses. 4,002,116, Cl. 100-100.000.

Knupfer, Hans: *See—*
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Konczal, Harry C., to Erie Manufacturing Company. Motor operated valve unit with heat dissipating clip member. 4,002,185, Cl. 137-338.000.

Kondo, Toshiyuki; and Ando, Masamoto, to Aisin Seiki Kabushiki Kaisha. Anti-skid brake control assembly. 4,002,376, Cl. 303-115.000.

Koninger, Horst: *See—*
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Konno, Tsugio; Matsumoto, Kohichi; Ohkubo, Shinichi; Hashino, Yasuo; Maeda, Kaoru; and Sayanagi, Giichi, to Asahi Kasei Kogyo Kabushiki Kaisha. Ultrafiltration apparatus. 4,002,567, Cl. 210-333.00R.

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Konrad, Charles Edward; and Brown, Lynnie Barry, to General Electric Company. Electric vehicle control analyzer. 4,002,972, Cl. 324-73.00R.

Kopito, Louis; Schuster, Samuel R.; and Kosasky, Harold, to Ovutime, Inc. Processes and devices for determining properties of viscous fluids. 4,002,056, Cl. 73-53.000.

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Koyano, Takashi; Matsushima, Yoshihisa; and Kitamura, Tetsuo, to Toa Nenryo Kogyo Kabushiki Kaisha. Copper carbonyl-containing catalytic solutions. 4,002,577, Cl. 252-433.000.

Kozak, John. Architectural constructional system. 4,001,986, Cl. 52-73.000.

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Kraatz, Gerald A., to Union Special Corporation. Clamping apparatus for automatic sewing machine. 4,002,129, Cl. 112-121.150.

Kraft, Brett W.; and Porter, Barbara J. Flat material folding device. 4,002,331, Cl. 270-61.00R.

Kramer, Edward R., to Stanspec Co. Jib crane. 4,002,243, Cl. 212-56.000.

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Kroboth, Richard J., to Towmotor Corporation. Lift assembly. 4,002,256, Cl. 214-731.000.

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Kuhn, Edmund W.; Matty, William P., Jr.; and McGuffie, Alan G., to Westinghouse Electric Corporation. Enclosed circuit interrupter with interlocked safety barrier. 4,002,864, Cl. 200-50.0AA.

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Kuhn, Leroy B., to Stauffer Chemical Company. Novel method for manufacturing plastisol resins. 4,002,702, Cl. 260-899.000.

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Kulbakh, Valter Osvaldovich; Kokushina, Tatyana Mikhailovna; Lagert, Irina Kondratievna; Mikhailets, Georgy Avxentievich; Kholodova, Galina Vasilievna; Ekzemplyarov, Oleg Nikolaevich; Zelmanov, Ruvim Bentsionovich; Sokolov, Leonid Borisovich; Etingov, Evgeny Davidovich; and Lushitskaya, Irina Mikhailovna. Meglumine complex fungicidal polyene macrolide antibiotic compositions and treatment method. 4,002,741, Cl. 424-180.000.

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Kuwada, Yutaka; Tawada, Hiroyuki; and Meguro, Kanji, to Takeda Chemical Industries, Ltd. Benzazepine derivatives. 4,002,638, Cl. 260-308.00C.

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Labana, Santokh S.; and Chang, Yun Feng, to Ford Motor Company. Powder coating composition with hydroxy functional copolymer and amino functional crosslinking agent. 4,002,699, Cl. 260-851.000.

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LaCanfora, Peter S., to Applicon Incorporated. Photoplotter. 4,003,061, Cl. 354-4.000.

Lagert, Irina Kondratievna: *See—*
Kulbakh, Valter Osvaldovich; Kokushina, Tatyana Mikhailovna; Lagert, Irina Kondratievna; Mikhailets, Georgy Avxentievich; Kholodova, Galina Vasilievna; Ekzemplyarov, Oleg Nikolaevich; Zelmanov, Ruvim Bentsionovich; Sokolov, Leonid Borisovich; Etingov, Evgeny Davidovich; and Lushitskaya, Irina Mikhailovna, 4,002,741.

Laing, Nikolaus. Electric submersible pump. 4,002,936, Cl. 310-166.000.

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Nicholls, Wilfrid Edward Walter; and Lakra, Paul, 4,002,415.

Lamb, Joe H. Swimming pool cover having a raised leading edge. 4,001,900, Cl. 4-172.140.

Lambert, Gerard Lucien, to Johns-Manville Corporation. Packaging asbestos fibers. 4,002,004, Cl. 53-24.000.

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Favrot, Paul, 4,001,983.

Lang, Marcello; and Ansaldo, Leonaldo, to Ato Chimie. Installation for coating substantially U-shaped or V-shaped articles. 4,002,144, Cl. 118-630.000.

Lange, Paul: *See—*
Rammler, Roland; and Lange, Paul, 4,002,534.

Langer, Rolf: *See—*
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Lapiere, Charles-Leon: *See—*
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King, Ian Robert; and Hildon, Anthony MacDonald, 4,002,693.

Laprade, Bernard R.; Laprade, Xavier J.; and Gele, Pierre J., to Societe Nationale des Petroles d'Aquitaine; and Les Usines Laprade. Carburetor. 4,002,704, Cl. 261-23.00A.

Laprade, Xavier J.: *See—*
Laprade, Bernard R.; Laprade, Xavier J.; and Gele, Pierre J., 4,002,704.

Lardi, Francesco; and Ronnen, Uri G., to Westinghouse Electric Corporation. Steam turbine valve positioning system having throttle valve test capability. 4,002,065, Cl. 73-168.000.

Lari, Ion, to Institutul de Cercetari si Proiectari de Petrol si Gaze. Tool joint for drill pipes. 4,002,359, Cl. 285-331.000.

Larsen, Tore Langemyr; and Holly, Kenneth, to Memorex Corporation. Dynamic loop gain alteration for data retrieval. 4,003,086, Cl. 360-53.000.

Larson, Willis A.; and Colglazier, David E., to Magic Dot, Inc. Touch actuated electronic switch. 4,002,923, Cl. 307-116.000.

Larsson, Lars-Ake Evert, to Telefonaktiebolaget L M Ericsson. Telecommunication system controlled by stored program instructions. 4,002,851, Cl. 179-18.0ES.

Laser Graphic Systems Corporation: *See*—
Brown, John Buchanan; and Gardiner, Frank J., 4,002,830.

Laser Video, Inc.: *See*—
Maiman, Theodore H.; and Payne, Errol G., 4,003,080.

Lathrop, Ross M.: *See*—
Fulghum, David A.; Powers, David A.; Lathrop, Ross M.; and Swallow, Robert W., 4,002,217.

Latora, Salvatore C. Cheese grating machine. 4,002,298, Cl. 241-36.000.

Lattin, William Walter: *See*—
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Laufenburg, Willy. Window fastener. 4,002,361, Cl. 292-336.300.

Lawlor, Robert E.; and Cornell, Paul A., to Cornell, Paul A. Cable clamp with size adjustment. 4,001,921, Cl. 24-132.0LS.

Lawrence Peska Associates, Inc.: *See*—
Chin, Kenneth Gan Gee, 4,002,341.
Mitchell, William, 4,002,096.
Page, Vernon, Jr., 4,002,233.
Petrowski, Adam, 4,002,329.
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LeBrasse, Gordon J.; and Gallatin, Victor, to Federal-Mogul Corporation. Process for making composite bearing material. 4,002,472, Cl. 75-208.00R.

Lech, Joseph M.: *See*—
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Lee Blacksmith, Inc.: *See*—
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Lee, Calvin C.: *See*—
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Lee, John Davidson: *See*—
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Leistiko, Lawrence F.: *See*—
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Leisure Group, Inc., The: *See*—
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LeMay, Christopher Archibald Gordon, to E M I Limited. Radiology. 4,002,910, Cl. 250-360.000.

LeMay, Christopher Archibald Gordon, to EMI Limited. Radiology. 4,002,913, Cl. 250-445.00T.

Leng, John Lindley: *See*—
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Leonard, Verna M. Chord progression selector. 4,002,097, Cl. 84-471.0SR.

Leonowicz, Eugene: *See*—
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Les Fabriques d'Assortiments Reunies: *See*—
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Les Usines Laprade: *See*—
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Lettis, Pamela J., heir: *See*—
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Leuschner, Horst, to Texas Instruments Incorporated. Five gate flip-flop. 4,002,933, Cl. 307-291.000.

Levy, Dale F.: *See*—
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Levy, Jerome F.: *See*—
Lewis, Sheldon N.; Levy, Jerome F.; and Horton, Napoleon L., 4,002,637.

Lewandowski, Raymond F., to Oak Industries Inc. Illuminated push-button switch. 4,002,873, Cl. 200-314.000.

Lewis, Donald W., to Summit Systems, Inc. System for encoding and decoding amplitude modulated signals. 4,002,825, Cl. 325-32.000.

Lewis, George D., to United Technologies Corporation. Nitrous oxide decomposition reactor. 4,002,431, Cl. 23-284.000.

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Liang, Robert Chao-Chuin, to International Business Machines Corporation. Latching driver circuit for a gas panel display. 4,002,946, Cl. 315-169.0TV.

Liao, Paul Foo-Hung: *See*—
Bridenbaugh, Paul Michael; Liao, Paul Foo-Hung; Tofield, Bruce Cedric; and Weber, Heinz Paul, 4,002,725.

Libbey-Owens-Ford Company: *See*—
Hamilton, Harold E.; Pastorek, Paul V.; Hagedorn, Floyd T.; and Revells, Robert G., 4,002,450.

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Streckenbach, Wilf-Christian, 4,002,984.

Lim, Mahn-Jick, to Western Electric Company, Inc. Method of forming silicon dioxide. 4,002,512, Cl. 148-187.000.

Linard, Robert. Scanning apparatus for measuring the dimension of an object. 4,002,919, Cl. 250-560.000.

Lind, Gertrud Agnes Matilda. Auto-traction table. 4,002,165, Cl. 128-71.000.

Lindblad, Nero R.; and Pearson, James M., to Xerox Corporation. Electrophotographic developer with polyvinylidene fluoride additive. 4,002,570, Cl. 252-62.10P.

Linder, Jerome, to Sandoz, Inc. 5-Hydrazinopyridazin-3(2H)-ones. 4,002,751, Cl. 424-250.000.

Litchfield, Leon George, to L.B. (Plastics) Limited. Construction of panels, enclosures or containers. 4,002,261, Cl. 220-80.000.

Little, Arthur J.; and Mayer, William R., to Stewart-Warner Corporation. Timed buzzer. 4,003,043, Cl. 340-403.000.

Ljubimova, Nina Andreevna: *See*—
Smirnov, Svetoslav Georgievich; Gorbacheva, Nadezhda Semenovna; Ershova, Ljubov Valentinovna; Ljubimova, Nina Andreevna; Pestova, Galina Grigorievna; Selekhova, Nina Pavlovna; Smirnova, Margarita Iiinichna; Tiflov, Alexandr Vladimirovich; and Fomina, Nina Alexeevna, 4,002,550.

Lode, Torger: *See*—
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Loeb, Barry L.; and Witsken, Kenneth J., to Emery Industries, Inc. Process for crystallizing 2,2-bis[3,5-dibromo-4-(2-hydroxyethoxy)-phenyl] propane. 4,002,688, Cl. 260-613.00R.

Loeliger, Peter: *See*—
Chodnekar, Madhukar Subraya; Loeliger, Peter; Pfiffner, Albert; Schwieter, Ulrich; Suchy, Milos; and Zurfluh, Rene, 4,002,647.

Loew, Peter: *See*—
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Loffelhardt, Dietmar, to Eberspacher, J. Device for the after-burning of exhaust gases. 4,002,026, Cl. 60-282.000.

Logemann, Willy: *See*—
Ambrogi, Vittorio; Logemann, Willy; Parenti, Marc Antonio; and Tommasini, Raffaele, 4,002,750.

Long, Clive Beech Ansley: *See*—
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Long, William D., Jr.: *See*—
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Lopata, Karl Peter; and Schiffer, Gunter, to Kleinewefers Industrie Companie GmbH. Roller sealing head for overpressure and underpressure containers. 4,002,346, Cl. 277-237.00R.

Lopez C., Guillermo. Electro-mechanical sign structure with alternating faces formed by several adjacent dihedral angles. 4,002,022, Cl. 58-126.00R.

Lord Corporation: *See*—
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Lorenz, Leo J., to Massey-Ferguson Inc. Air filter clamping mechanism for cab. 4,002,443, Cl. 55-357.000.

Lorenzini, Gianni. Apparatus and method for straightening semi-conductor pins. 4,002,191, Cl. 140-147.000.

Loshaek, Samuel, to Wesley-Jessen Inc. Contact lens container. 4,002,234, Cl. 206-205.000.

Lott, James L., to United States of America, Army. Method for producing polymer impregnated foamed masonary elements. 4,002,708, Cl. 264-42.000.

Lott, James L., to United States of America, Army. Two-phase material of concrete and polymer and its method of preparation. 4,002,788, Cl. 428-70.000.

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Love, Richard F.: *See*—
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Lowther, Frank Eugene, to Union Carbide Corporation. High frequency power supply. 4,002,921, Cl. 307-43.000.

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Lucas, Anthony James: *See*—
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Luco-Technic AG: *See*—
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Ludwig, Frank A., to Ford Motor Company. Alkali metal, sulfur battery or cell with single phase sulfur electrode. 4,002,807, Cl. 429-104.000.

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Luedtke, Arthur; and Bentley, William F., Jr., to United States of America, Federal Communications Commision. Rear window direction finding antenna. 4,003,057, Cl. 343-713.000.

Luker, John P.: *See*—
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M S Laboratories Inc.: *See*—
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Ma, John Y., to Zenith Radio Corporation. Television receiver with tuner capable of receiving air and CATV signals. 4,002,986, Cl. 325-459.000.
Maas, Willem, to U.S. Philips Corporation. Plant-growth promoting agent which is provided with trace elements and which is suited for use in ultra-low-volume applications. 4,002,456, Cl. 71-3.000.
Mabuchi, Shunsuke; Tsuzuki, Kenji; and Matsunaga, Hideaki, to Toyo Soda Manufacturing Co., Ltd. Process for the reactivation of nickel catalysts used in the hydrogenation of polymeric peroxides. 4,002,692, Cl. 260-617.00R.
MacMillan, William Robertson, to Wheelabrator-Frye, Inc. Apparatus for cleaning casting. 4,001,976, Cl. 51-9.00R.
Macovski, Albert, to Maxim Diagnostic Imaging. Transparency contrast enhancement system. 4,002,914, Cl. 250-461.00R.
MacPhee, John M.; and Gasparrini, Charles Robert, to Baldwin-Gegenheimer Corporation. Sheet material decurling apparatus. 4,002,047, Cl. 72-160.000.
MacRae, Donald R.; Gold, Richard G.; Sandall, William R.; Thompson, Charles D.; and Cheplick, Peter G., to Bethlehem Steel Corporation. Method of reducing ores. 4,002,466, Cl. 75-11.000.
Maddox, Chesford M. Ore beneficiation method and apparatus. 4,002,462, Cl. 75-1.00R.
Madsen, Hans Berg: *See—*
Solli, Hauk; Klemmensen, Per Dausell; Holst, Preben Lindholm; and Madsen, Hans Berg, 4,002,615.
Maeda, Haruo, to Olympus Optical Co., Ltd. Objective. 4,002,407, Cl. 350-229.000.
Maeda, Isamu: *See—*
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Maeda, Kaoru: *See—*
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Magdo, Ingrid E.; and Magdo, Steven, to International Business Machines Corporation. Method for forming masks comprising silicon nitride and novel mask structures produced thereby. 4,002,511, Cl. 148-187.000.
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Malberg, Kenneth E. Multiple pattern display device. 4,002,401, Cl. 350-4.000.
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Mammel, Lewis Howard, to Bell Telephone Laboratories, Incorporated. Self latching and unlatching connector assembly. 4,002,389, Cl. 339-91.00R.
Manaenkov, Valery Ivanovich: *See—*
Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Bilyavsky, Anatoly Arkadievich; Gorodnitsyna, Vera Evdokimovna; Elkina, Evgenia Dmitrievna; Manaenkov, Valery Ivanovich; Polyanskaya, Ljudmila Nikolaevna; Sorokin, Jury Leonidovich; Taran, Anatoly Zakharovich; and Fadeev, Evgeny Alexeevich, 4,002,444.
Mandeville, Gordon James; and McLean, Dale Irving, to Bell Telephone Laboratories, Incorporated. Pilot tone controlled adaptive amplitude equalizer. 4,003,006, Cl. 333-16.000.
Mangrum, Lee R. Boat hull construction. 4,002,131, Cl. 114-56.000.
Manning, James H.; and Stark, John H., to International Paper Company. Diester crosslinked polyglucan hydrogels and reticulated sponges thereof. 4,002,173, Cl. 128-296.000.
Mantani, Rokurota, to Nippon Gakki Seizo Kabushiki Kaisha. Waveform converter for use with an electronic musical instrument and capable of controlling the duty factor of a rectangular wave tone signal. 4,002,095, Cl. 84-1.010.
Marcellini, Robert, to Charbonnages de France. Leakproof mounting device for the support plate of a fluidization reactor grid. 4,002,263, Cl. 220-378.000.
Marchesani, Cesare N., to Colgate-Palmolive Company. Dispensing means for moist tissues. 4,002,264, Cl. 221-63.000.
Marconi Company Limited, The: *See—*
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Martin, Frederick W., to West Company, The. Reciprocating apparatus with a controllable dwell time at each end of the stroke. 4,002,103, Cl. 91-219.000.
Martin, Guy E., to Aluminum Company of America. Oil mist lubrication of centrifugally loaded bearings. 4,002,379, Cl. 308-187.000.
Martin, Kenneth Watt, to International Telephone and Telegraph Corporation. Electronic telephone network. 4,002,852, Cl. 179-81.00B.
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Mathis, Cleo D. Combined swimming and therapy pool. 4,001,899, Cl. 4-172.000.
Matsubara, Isamu, to Yoshida Kogyo Kabushiki Kaisha. Interlocking handrail construction for balustrades. 4,002,322, Cl. 256-65.000.
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Matsushita, Takeshi; and Hayashi, Hisao, to Sony Corporation. Semiconductor device with high voltage breakdown resistance. 4,003,072, Cl. 357-52.000.
Mattes, Hans George; and Oates, Daniel Edward, to Bell Telephone Laboratories, Incorporated. Visual ring indicator. 4,002,853, Cl. 179-84.00L.
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McKinney, Harold D. Volumetric filling system. 4,002,268, Cl. 222-1.000.
McLane, Jack S. Cooking apparatus. 4,002,113, Cl. 99-447.000.
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McLeod, John H., to Allied Chemical Corporation. Azo dyes having an amino group para to the azo linkage. 4,002,607, Cl. 260-198.000.
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Meinke, Peter, to Maschinenfabrik Augsburg-Nurnberg AG. Vertically supported rotary body. 4,002,378, Cl. 308-147.000.
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Mengel, Clare L., to United States of America, Navy. Target adaptive radar system. 4,003,053, Cl. 343-14.000.
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Menocal, Gustavo A., to I-T-E Imperial Corporation. Stab arrangement for busbars. 4,002,388, Cl. 339-22.00B.
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Merrin, Seymour, to Innotech Corporation. Glass electronic devices employing ion-doped insulating glassy amorphous material. 4,003,075, Cl. 357-2.000.
Merry, Roydon William; and Sherman, James Lee, to AMP Incorporated. Contact means for flat conductor cable and method of connecting same. 4,002,393, Cl. 339-97.00C.
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Merz, Josef, to Daimler-Benz Aktiengesellschaft. Equalizing tank for the volume equalization and the air separation of a liquid heat carrier flowing through a circulatory system. 4,002,442, Cl. 55-309.000.
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Michel, Aubrey Jonathan. Device for storing and applying cosmetics. 4,002,182, Cl. 132-88.700.
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Miller, Donald G., to American Pulverizer Company. Reducing machine having a positively displaced grate. 4,002,302, Cl. 241-89.000.
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Miller, Lloyd D.: *See—*
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Miller, Richard W.: *See—*
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Miller, Samuel A., to United States of America, Navy. Phase locked servo loop circuit. 4,002,962, Cl. 318-329.000.
Milton, A. Fenner, to United States of America, Navy. Single mode laser multiterminal optical data communication system. 4,002,898, Cl. 250-199.000.
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Minor, Ross D.; and Minor, Cleta M. Automatic electronic lock off system for an appliance. 4,002,956, Cl. 317-154.000.
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Mito, Hiroshi. Lens hood for zoom lenses. 4,002,402, Cl. 350-58.000.
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Molina, Orlando G., to Rockwell International Corporation. Penetrant flaw inspection method. 4,002,905, Cl. 250-302.000.
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, to Bayer Aktiengesellschaft. Pyrazole derivatives. 4,002,641, Cl. 260-310.00R.
Moller, Hilmar; and Wiegand, Joachim, to Hoechst Aktiengesellschaft. Process for the manufacture of dyed multicomponent filaments. 4,002,427, Cl. 8-155.100.
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Moore, Thomas B. Static-type mixer and receptacle. 4,002,289, Cl. 229-44.00R.
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Mowatt-Larssen, Erling, to General American Transportation Corporation. Railway tank car train having a two-way loading and unloading system. 4,002,192, Cl. 141-35.000.
Moyer, Norman E., to Hughes Aircraft Company. High speed divide-by-N circuit. 4,002,926, Cl. 307-225.00C.
Mozer, Larry P., to Phillips Petroleum Company. Controlled air in polyester tube extrusion for clear sealable parison. 4,002,709, Cl. 264-90.000.
Mruck, Hans-Joachim; and Maier, Gerhard, to Maschinenfabrik B. Maier KG. Chip-forming apparatus. 4,002,300, Cl. 241-37.500.
Mueller, Martin; and St. Clair, David L., to Owens-Illinois, Inc. Package of nested containers and method and apparatus for producing same. 4,002,005, Cl. 53-26.000.
Muhring, Walter; and Gossling, Ernst-Gunther. Matting for the prevention of hydraulic erosion. 4,002,034, Cl. 61-3.000.
Mukherjee, Samir; and Shepherd, William Ford, to Electro Networks, Division of Chloride, Inc. N. American Operations. Bidirectional constant impedance low pass/high pass filter circuit. 4,003,005, Cl. 333-8.000.
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Murdoch, Francis J., to United States of America, Army. Insulation of microcircuit interconnecting wires. 4,002,282, Cl. 228-4.500.
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Naglieri, Anthony N.; and Rizkalla, Nabil, to Halcon International, Inc. Preparation of carboxylic acid anhydrides. 4,002,678, Cl. 260-549.000.

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Nestler, Heinz; Amort, Jurgen; and Plankl, Leo Hans, to Dynamit Nobel Aktiengesellschaft. Impregnation of masonry having a neutrally or acidly reaction surface. 4,002,800, Cl. 428-447.000.

Nestoridis, Antonios, to Financial Mining - Industrial and Shipping Corporation. Upgrading the nickel content from low grade nickel lateritic iron ores. 4,002,463, Cl. 75-1.00R.

Neti, Radhakrishna M.; and Bing, Colin C., to Beckman Instruments, Inc. Electrochemical reference electrode. 4,002,547, Cl. 204-195.00F.

Neumer, John Fred, to Du Pont de Nemours, E. I., and Company. Disperse bisanil dyes derived from diaminomaleonitrile and their preparation. 4,002,616, Cl. 260-240.00G.

Nevin, Robert Leland; O'Leary, John Joseph; and Cikotte, Leonard Joseph, to General Electric Company. Polar coordinate format to a cartesian coordinate format scan converter. 4,002,827, Cl. 343-5.0SC.

Newcomb, Nelson F.; and Newcomb, Nelson F., Jr. Illuminated playball. 4,002,893, Cl. 240-6.40R.

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Nippon Gakki Seizo Kabushiki Kaisha: *See—*
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Zhupakhin, Anatoly Dmitrievich; Prokoshev, Gennady Ivanovich; Karavashkin, Boris Konstantinovich; Shved, Felix Iosifovich; Maksutov, Rashat Faskheevich; Gavrilin, Evgeny Fedorovich; Mushenkov, Vasily Andreevich; Sergeev, Anatoly Borisovich; Shkapa, Alexandr Fedorovich; and Zhivichkin, Lev Alexandrovich, 4,002,816.
Pryor, John A.; and Rowles, Howard C., to Air Products and Chemicals, Inc. Recovery of C_3+ hydrocarbons by plural stage rectification and first stage dephlegmation. 4,002,042, Cl. 62-28.000.
Pujol, Andre Joseph. Continuous-flow wine-making apparatus. 4,002,111, Cl. 99-276.000.
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Putnam, Dean H., to Dietzgen Corporation. Film striping apparatus. 4,002,142, Cl. 118-68.000.
Putt, Dan W. Protector module test set. 4,002,861, Cl. 179-175.000.
Pyrotector, Incorporated: *See*—
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Quakenbush, Howard M., to Flexsteel Industries, Inc. Convertible seat-bed. 4,001,901, Cl. 5-37.00R.
Quaker Oats Company, The: *See*—
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Quantel Limited: *See*—
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Quick Rip Corporation: *See*—
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Quinn, Billy Roy; and Quinn, Jimmy Don. Radio station identifier. 4,002,140, Cl. 116-135.000.
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Raasch, Hans, to W. Schlafhorst & Co. Method and apparatus for winding conical cross-wound coils or bobbins with constant thread-feeding velocity. 4,002,306, Cl. 242-18.00R.
Rackman, Michael I. Tamper-proof two-way cable system. 4,002,843, Cl. 179-15.0AL.
Radebold, Reinhart. Support structure for solar energy converter. 4,002,158, Cl. 126-270.000.
Radeloff, Christian; and Herrmann, Horst, to Vacuumschmelze GmbH. Semi-hard magnetic glass sealable alloy system of cobalt-nickel-titanium-iron. 4,002,506, Cl. 148-31.550.
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Rader, James A. Food handling tongs. 4,002,365, Cl. 294-8.000.
Rainbolt, Jack D.; and Suerdieck, Ronald R., to B. F. Goodrich Company, The. Disc brake. 4,002,226, Cl. 188-73.300.
Rainer, Norman B.; and Wilson, Peter Allen, to Philip Morris Incorporated. Microporous styrene polymers and method of making same. 4,002,177, Cl. 131-10.00R.
Rajakovics, Gundolf E., to Vereinigte Edelstahlwerke AG. Arrangement for preventing undesired fluid backflow during start-up and shutdown of two-stage evaporation installations. 4,002,536, Cl. 202-173.000.
Rambert, Andre; and Bousquet, Gilles. Prosthesis for a joint. 4,001,897, Cl. 3-1.913.
Rambosek, George Phillip, to Minnesota Mining and Manufacturing Company. Animal gas mask assembly. 4,002,167, Cl. 128-205.000.
Ramer, Paul C. Ski binding. 4,002,354, Cl. 280-614.000.
Rammler, Roland; and Lange, Paul, to Metallgesellschaft Aktiengesellschaft. Continuous coking process. 4,002,534, Cl. 201-6.000.
Randolph, Allan Emerson, Sr., to Ready Stamping System, Inc. Forming tool for use in a die assembly. 4,002,049, Cl. 72-388.000.
Randolph, Michael M.: *See*—
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Ransburg Corporation: *See*—
Juvinall, James W.; and Kock, Erhard, 4,002,777.
Rao, Bhaskara M. L., to Exxon Research and Engineering Company. Rechargeable lithium-aluminum anode. 4,002,492, Cl. 429-194.000.
Raskin, Walter, to Dean Products, Inc. Extended fin heat exchanger panel. 4,002,200, Cl. 165-131.000.
Rast, Gustaf J., Jr.; Barley, Thomas A.; and Ashley, James R., to United States of America, Army. Wide operating frequency range transmission line discriminator. 4,002,971, Cl. 324-57.00N.
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Ashley, James R.; Rast, Gustaf J., Jr.; and Barley, Thomas A., 4,002,970.
Barley, Thomas A.; Rast, Gustaf J., Jr.; and Ashley, James R., 4,002,969.
Ratigan, Edward. Oceanographic water sampler. 4,002,066, Cl. 73-170.00A.
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Raychem Corporation: *See*—
Schweiso, Robert J., 4,001,928.
Sonnenberg, Joseph, 4,002,645.
Rayfield, Donald K. Device for supporting a ball container from a tennis racket. 4,002,337, Cl. 273-73.00R.
Raymond International Inc.: *See*—
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Phares, Lindsey J.; and Gendron, George J., 4,002,038.
Raymond Lee Organization, Inc., The: *See*—
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Demmy, Robert C., 4,002,941.
den Hollander, Willem, 4,002,965.
McDonie, Arthur Frederick; and Tomasetti, Charles Michael, 4,002,735.
Miller, Jeffrey Ellis, 4,003,050.
Sterzer, Fred; and Kaplan, Gerald Stanley, 4,003,049.
Wu, Chin Tao, 4,003,085.
Reade, Grahame Melvin; and Viney, Alan Charles, to Imperial Chemical Industries Limited. Method and device for coating plastics film. 4,002,780, Cl. 427-209.000.
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Ready Stamping System, Inc.: *See*—
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Recherche et Industrie Therapeutiques (R.I.T.): *See*—
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Reed, Charles C.; Cooley, Denton A.; and Sharp, Russell G., to Texas Medical Products, Inc. Air embolus aspirator. 4,002,174, Cl. 128-347.000.
Reed, L. J., to Motorola, Inc. Digital frequency synthesizer having selectable frequency offset between transmit and receive frequencies. 4,002,995, Cl. 331-1.00A.
Regan, Robert J.; and Haugsjaa, Paul O., to GTE Laboratories Incorporated. Tunable microwave cavity. 4,002,943, Cl. 315-39.000.
Regan, Robert J.: *See*—
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Reid, Ian, to General Signal Corporation. Ground fault detector for a two-wire power supply. 4,002,968, Cl. 324-51.000.
Reiff, Almer A.: *See*—
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Reiner, Lawrence L.; and Brady, William A. Poker pool game. 4,002,339, Cl. 273-123.00A.
Reiner, Robert Leopold, to Cleveland Machine Controls, Inc. Vibratory feeder system. 4,002,270, Cl. 222-58.000.
Reinhall, Rolf Bertil. Device for automatic correction of unbalance in rapidly rotating machine elements. 4,002,086, Cl. 74-573.00F.
Reliable Electric Company: *See*—
Sedlacek, William S.; Paluch, Edward S.; and Brey, William Andrew, 4,002,856.
Stein, Richard P., 4,002,848.
Remley, Winslow Rodeck, to United States of America, Navy. Digital beamforming system. 4,003,016, Cl. 340-6.00R.
Repik, Albert J.; Miller, Charles E.; and Johnson, Homer R., to Westvaco Corporation. Two-step process for conditioning sized coal and resulting product. 4,002,533, Cl. 201-1.000.
Research Corporation: *See*—
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Resources Conservation Co.: *See*—
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Restall, Raymond B., to Raymond Lee Organization, Inc., The, a part interest. Plaque removing device. 4,002,183, Cl. 132-91.000.
Reuter, Peter; Eilingsfeld, Heinz; and Patsch, Manfred, to BASF Aktiengesellschaft. Manufacture of anthraquinone. 4,002,653, Cl. 260-369.000.
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Rheem Manufacturing Company: *See—*
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Rhodes, Kenneth R.: *See—*
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Ribka, Joachim: *See—*
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Rice, Dale W., to Corning Glass Works. Particulate material feeder for high temperature vacuum. 4,002,274, Cl. 222-410.000.
Rice, Frank L.; and Wilson, Arthur C., to General Electric Company. Removable door hinge system. 4,001,973, Cl. 49-386.000.
Richards, Glenn L.; and Pommerening, Uwe A., to Stromberg-Carlson Corporation. Trunk adapter. 4,002,850, Cl. 179-18.0AH.
Richmond, William O., Jr., to Wolsk Associates, Ltd. Alarm device having an oscillator. 4,003,044, Cl. 340-253.00C.
Ricoh Co., Ltd.: *See—*
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Ridler, Kenneth B.; and Walsh, Frank, to Vesco Manufacturing and Supply Limited. Attachment for articulated vehicle. 4,002,253, Cl. 214-147.00G.
Riefler, Monte. Concrete block panel. 4,001,988, Cl. 52-125.000.
Riegler, Ernst; Kron, Heinrich; and Bittner, Klaus-Jurgen, to Hoechst Aktiengesellschaft. Process and apparatus for shirring tubular casings. 4,001,914, Cl. 17-42.000.
Riganati, John P.; and Vitols, Visvaldis A., to Rockwell International Corporation. Two-dimensional binary data enhancement system. 4,003,024, Cl. 340-146.30H.
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Ritzerfeld, Gerhard. Rotary copying machine. 4,002,117, Cl. 101-91.000.
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Naglieri, Anthony N.; and Rizkalla, Nabil, 4,002,678.
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Rohm and Haas Company: *See—*
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Rovin, Herman; Opuszenski, Theodore; Pellicano, Joseph; and Swenson, Alan F., to Automatech Industries, Inc. Automatic bobbin rewinding for sewing machines. 4,002,130, Cl. 112-180.000.
Rovnyak, George C., to E. R. Squibb & Sons, Inc. Substituted indolinones. 4,002,749, Cl. 424-246.000.
Rowe, George E., deceased (by Rowe, Selma S., executrix), to Emhart Industries, Inc. Glassware forming machine of the I. S. type for upright press and blow process. 4,002,454, Cl. 65-229.000.
Rowe, Selma S., executrix: *See—*
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Rubin, Isaac D.; Love, Richard F.; and Holder, Charles B., to Texaco Inc. Lubricating oil composition containing aminoester dispersant. 4,002,569, Cl. 252-51.50A.
Ruiz-Barbotteau, Alejandro. Bobbin for cinematographic films. 4,002,309, Cl. 242-71.800.
Rundberg, Eric G. S., Jr.; Johnson, William R., Jr.; and Grubbs, Harvey J., to Philip Morris Incorporated. Smoking compositions incorporating a menthol-release agent. 4,002,179, Cl. 131-17.00A.
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Satchell, Donald P., Jr., to Continental Oil Company. Multiple point injection of hydrogen donor diluent in thermal cracking. 4,002,556, Cl. 208-107.000.

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Satzinger, Gerhard; and Hechtfischer, Gustav, to Warner-Lambert Company. Process for substituted cyclohexenes and its products. 4,002,665, Cl. 260-471.00A.

Saveth, Saul. Relatively flat blank for a container and the container made therefrom. 4,002,287, Cl. 229-23.0AB.

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Schaumann, Dietrich, to Hawera Probst Kommanditgesellschaft Hartmetall-Werkzeugfabrik Ravensburgh. Drilling tool, especially for hammer drills. 4,002,214, Cl. 175-405.000.

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Schlafer, Ludwig; and Hoyer, Ernst, to Hoechst Aktiengesellschaft. Water-soluble phenyl-azo-naphthyl compounds. 4,002,606, Cl. 260-196.000.

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Sitnichenko, Valentin Mikhailovich; Zamuruev, Alexandr Mikhailovich; and Kogut, Andrei Isakovich. Phototracing system. 4,002,900, Cl. 250-202.000.
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Sterzer, Fred; and Kaplan, Gerald Stanley, to RCA Corporation. Dual mode automobile collision avoidance radar. 4,003,049, Cl. 343-6.00R.
Stevenson, Donald R.: *See—*
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Stewart, Alexander G., to United States of America, Army. High power pulse compression techniques. 4,003,007, Cl. 333-20.000.

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Stoepel, Kurt: *See—*
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Streander, George W., to Design Systems, Inc. Solar energy absorbing article and method of making same. 4,002,541, Cl. 204-33.000.
Streckenbach, Wiilf-Christian, to Licentia Patent-Verwaltungs-G.m.b.H. Circuit arrangement for determining the time duration of received oscillations. 4,002,984, Cl. 325-392.000.
Streit, Kenneth F., to Phone-Ducs, Inc. Adapter for connecting conduit to pipe. 4,002,358, Cl. 285-137.00R.
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Stromberg-Carlson Corporation: *See—*
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Yamamoto, Hisao; Inaba, Shigeho; Okamoto, Tadashi; Hirohashi, Toshiyuki; Ishizumi, Kikuo; Yamamoto, Michihiro; Maruyama, Isamu; Mori, Kazuo; and Kobayashi, Tsuyoshi, 4,002,611.
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Sun, Shan C.; and Chaprnka, Anthony G., to Westinghouse Electric Corporation. Measuring circuit. 4,002,977, Cl. 324-132.000.
Sundar, Parameshwaran S., to Westinghouse Electric Corporation. Sulfide precipitation method of separating uranium from group II and group III metal ions. 4,002,716, Cl. 423-10.000.
Sundelin, Ronald Murl. Electronic price display unit. 4,002,886, Cl. 235-61.70R.
Sundstrom, Ingvar Georg: *See—*
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Suppus, Heinz F. W., to Metall-Werk Merkur GmbH. Method of making a cold welded connection. 4,002,284, Cl. 228-115.000.
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Suzuki, Masaaki: *See—*
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Swales, Frank, deceased; by Swales, Doris, heir; by Swales, Sally M., heir; and by Lettis, Pamela J., heir, to United States of America, Navy. Missile stage coupler. 4,002,120, Cl. 102-49.500.
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Swift, John A.: *See—*
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Swift, June H.; and Swift, John A. Self-watering planter and process of making. 4,001,967, Cl. 47-80.000.
Swiss Aluminium Ltd.: *See—*
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Syntex (U.S.A.) Inc.: *See—*
Beard, Colin C.; Edwards, John A.; and Fried, John H., 4,002,640.
Sysyn, Jerry, to United States of America, Navy. Towing vehicle having a cart-hitching mechanism. 4,002,353, Cl. 280-490.00R.
Taccetta, Philip Anthony; and Novak, Robert Michael, to International Telephone and Telegraph Corporation. Automatic high voltage grounding device for personnel safety. 4,002,869, Cl. 200-61.700.
Taft, Arnold Jay, to Personal Products Company. Water-dispersible ionic polyurethane binder for nonwoven fabrics. 4,002,171, Cl. 128-284.000.
Taiiheiyo Engineering Incorporated: *See—*
Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; Endo, Hajime; and Kiyama, Nobuo, 4,002,037.
Takagi, Haruo; and Aoki, Reijiro, to Omron Tateisi Electronics Co. Electronic cash register. 4,003,030, Cl. 340-172.500.
Takagi, Sadaaki, to Fujitsu Ltd. Method of manufacturing an insulated gate field effect transistor. 4,003,071, Cl. 357-42.000.
Takahashi, Akio; Saito, Hirokichi; and Gyaizu, Yoshijiro, to Ihara Chemical Kogyo Kabushiki Kaisha. Process for the production of urethane elastomers. 4,002,584, Cl. 260-18.0TN.
Takahashi, Akira; and Kobayashi, Mikio, to Ricoh Co., Ltd. Power supply regulator for an automatic exposure adjusting circuit for use in a camera. 4,003,063, Cl. 354-50.000.
Takahashi, Ken: *See—*
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Takahashi, Kousuke; and Kohara, Haruki, to Nippon Electric Company, Ltd. Symbol string pattern recognition equipment. 4,003,022, Cl. 340-146.3MA.
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Takemura, Yozo; Akiyoshi, Eisuke; Matsukubo, Hiroshi; and Shibata, Toshihiko, to Nippon Steel Corporation. Measuring lance for molten metal such as steel. 4,002,069, Cl. 73-354.000.
Takeuchi, Tatsuo; Motobayashi, Kozo; and Kamiya, Kazuo, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho; and Daiwa Boseki Kabushiki Kaisha. Device for forming a tail wind around a bobbin held by a take-up mechanism of a ringless spinning machine. 4,002,305, Cl. 242-18.0PW.
Tamet, Jean-Louis: *See—*
Barbe, Gerard; Habault, Robert; and Tamet, Jean-Louis, 4,002,795.

Tamura, Ronald K., to Rockwell International Corporation. High speed, high yield CMOS/SOS process. 4,002,501, Cl. 148-1.500.

Tanaka, Shigenobu; Nishikawa, Seiichi; and Ishikawa, Seiji, to Fujikura Cable Works, Ltd., The. High speed binding device. 4,002,011, Cl. 57-15.000.

Tanaka, Yukiyasu: *See—*
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Tank, Eggert; and Pigisch, Franz, to Daimler-Benz Aktiengesellschaft. Method for reducing harmful stresses in layers applied by thermal spraying. 4,001,930, Cl. 29-460.000.

Taplin, Lael Brent, to Bendix Corporation, The. Integrating angular accelerometer. 4,002,077, Cl. 73-503.000.

Tapmatic Corporation: *See—*
Johnson, Allan S., 4,002,348.

Taran, Anatoly Zakharovich: *See—*
Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Bilyavsky, Anatoly Arkadievich; Gorodnitsyna, Vera Evdokimovna; Elkina, Evgenia Dmitrievna; Manaenkov, Valery Ivanovich; Polyanskaya, Ljudmila Nikolaevna; Sorokin, Jury Leonidovich; Taran, Anatoly Zakharovich; and Fadeev, Evgeny Alexeevich, 4,002,444.

Tashiro, Yasuhisa: *See—*
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Tate & Lyle Limited: *See—*
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Tawada, Hiroyuki: *See—*
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Taylor, Glenn R.: *See—*
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Taylor, Kennedy G., Jr., to Genesco, Inc. Shoe construction. 4,001,954, Cl. 36-16.000.

Taylor, Lynn J.; and Grier, John D., to Owens-Illinois, Inc. Substrate coating composition. 4,002,583, Cl. 260-17.00R.

Taylor, Roy. Carding apparatus. 4,001,917, Cl. 19-104.000.

Taylor, Roy: *See—*
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Technicon Instruments Corporation: *See—*
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Technology Glass Corporation: *See—*
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Teledyne McCormick Selph, an operating division of Teledyne Industries, Inc.: *See—*
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Eriksson, Nils Tage; Jacobsson, Rune William; and Sundstrom, Ingvar Georg, 4,003,055.
Larsson, Lars-Ake Evert, 4,002,851.

Tellie, Paul E. Firearms. 4,002,101, Cl. 89-142.000.

te Nijenhuis, Bauke, to Gist-Brocades N.V. Alkaline protease produced by a bacillus. 4,002,572, Cl. 252-99.000.

Teodorescu, Constantin; Chiriac, Ilie; and Iacob, Ion Stelian, to Institutal Pentru Creatie Stintifica si Tehnica. Automatic obturator for a gasodynamic ventilation device. 4,002,110, Cl. 98-43.00R.

Terada, Fumio: *See—*
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Terai, Masaaki; Kakehi, Kazuhiko; Matsuda, Ryoichi; and Ito, Giichi, to Nippon Telegraph and Telephone Public Corporation. Transmitting and receiving apparatus. 4,002,860, Cl. 179-170.00R.

Terral, Ben David, to Camco, Incorporated. Well installation. 4,002,203, Cl. 166-117.500.

Tesla, narodni podnik: *See—*
Kavalir, Jaroslav; and Studnicka, Miroslav, 4,002,983.

Testa-Laboratorium A/S: *See—*
Blumensaadt, Hans Christian, 4,001,950.

Tetlie, Per, to Aksjeselskapet Mikro-Elektronik. Device for fixing a printed circuit board to a casket-like support. 4,002,953, Cl. 317-101.0DH.

Tex Del Inc.: *See—*
Feighery, James M., 4,002,308.

Texaco Development Corporation: *See—*
Waddill, Harold George; and Schulze, Heinz, 4,002,598.

Texaco Inc.: *See—*
Pitts, Robert W., Jr.; and Scott, Hubert D., 4,002,903.
Rubin, Isaac D.; Love, Richard F.; and Holder, Charles B., 4,002,569.
Smith, Harry D., Jr.; Schultz, Ward E.; and Arnold, Dan M., 4,002,904.

Texas Instruments Incorporated: *See—*
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Leuschner, Horst, 4,002,933.

Texas Medical Products, Inc.: *See—*
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Textron, Inc.: *See—*
Colechia, Edward A., 4,002,098.
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Th. Goldschmidt AG: *See—*
Fock, Jurgen; and Holtschmidt, Ulrich, 4,002,781.

Theissen, Robert J., to Mobil Oil Corporation. 2-Nitro-5-(cyano-trifluoromethyl-phenoxy)benzoic acids and esters. 4,002,662, Cl. 260-465.00D.

Theodore, Michael J.: *See—*
Paterson, Malcolm M.; and Theodore, Michael J., 4,002,559.

Thomas, Edward Wherry, to Bell Telephone Laboratories, Incorporated. Method and apparatus for testing circuits. 4,002,974, Cl. 324-73.00R.

Thomas, Ivor Lewis, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Dynamically tuned gyroscopes. 4,002,078, Cl. 74-5.00R.

Thomas, Vernon E.: *See—*
Cordiano, Dominic D.; Kastelic, Joseph D.; and Thomas, Vernon E., 4,002,394.

Thomas, William R., to Owens-Corning Fiberglas Corporation. Insulation for a vehicle roof. 4,002,367, Cl. 296-137.00A.

Thompson, Charles D.: *See—*
MacRae, Donald R.; Gold, Richard G.; Sandall, William R.; Thompson, Charles D.; and Cheplick, Peter G., 4,002,466.

Thompson, George H. B., to International Standard Electric Corporation. Integrated optical circuit. 4,002,997, Cl. 331-94.50H.

Thompson, John Martin, to Imperial Chemical Industries Limited. Bis-(2-hydroxyethyl)-terephthalate. 4,002,667, Cl. 260-475.00P.

Thomson-CSF: *See—*
Pehe, Jean Pierre, 4,002,938.

Thunus, Leopold N.: *See—*
Delarge, Jacques E.; Thunus, Leopold N.; Lapiere, Charles-Leon; and Georges, Andre H., 4,002,629.

Tieman, Charles H.; Kollmeyer, Willy D.; and Roman, Steven A., to Shell Oil Company. 2-(Nitromethylene)-1,3-diazacycloalkane insect control agents. 4,002,765, Cl. 424-273.000.

Tiflov, Alexandr Vladimirovich: *See—*
Smirnov, Svetoslav Georgievich; Gorbacheva, Nadezhda Semenovna; Ershova, Ljubov Valentinovna; Ljubimova, Nina Andreevna; Pestova, Galina Grigorievna; Selekhova, Nina Pavlovna; Smirnova, Margarita Ilinichna; Tiflov, Alexandr Vladimirovich; and Fomina, Nina Alexeevna, 4,002,550.

Tigre Tierra, Inc.: *See—*
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Tiitinen, Heikki Aukusti: *See—*
Heimala, Seppo Olavi; Hyvarinen, Olli Viljo Juhani; Kinnunen, Jorma Pentti Eenokki; and Tiitinen, Heikki Aukusti, 4,002,544.

Timbs, Norman E. Single lever control for variable speed bicycles and the like. 4,002,350, Cl. 280-236.000.

Tingey and Company (Engineers) Limited: *See—*
Fincham, Sydney Robert; and Munday, Richard John, 4,002,255.

Toa Nenryo Kogyo Kabushiki Kaisha: *See—*
Koyano, Takashi; Matsushima, Yoshihisa; and Kitamura, Tetsuo, 4,002,577.

Todd, Paul H., Jr., to Kalsec, Inc. Process for isomerizing alpha acids to iso-alpha acids. 4,002,683, Cl. 260-586.00D.

Toesca, Rene A. M, to Energy Transformation Corporation. Gas turbine heating apparatus. 4,002,157, Cl. 126-110.00B.

Tofe, Andrew John: *See—*
Hartman, Frederick Anthony; Kretschmar, Herbert Charles; and Tofe, Andrew John, 4,002,730.

Tofield, Bruce Cedric: *See—*
Bridenbaugh, Paul Michael; Liao, Paul Foo-Hung; Tofield, Bruce Cedric; and Weber, Heinz Paul, 4,002,725.

Tokiwa, Fumikatsu: *See—*
Mizutani, Hiroshi; Tokiwa, Fumikatsu; Imamura, Tetsuya; and Sakurada, Toshiro, 4,002,579.

Tolleson, Gary L. Survival kit comprising collapsible cross-bow. 4,002,236, Cl. 206-577.000.

Tolosa, Felix P.; and Boxer, Lawrence, to Dynatech Laboratories, Incorporated. Combination tape dispenser and tray sealer device. 4,002,009, Cl. 53-296.000.

Tomasetti, Charles Michael: *See—*
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Tommasini, Raffaele: *See—*
Ambrogi, Vittorio; Logemann, Willy; Parenti, Marc Antonio; and Tommasini, Raffaele, 4,002,750.

Tomomatsu, Hideo, to Quaker Oats Company, The. Modified, fire retardant polytetramethylene ether glycol. 4,002,689, Cl. 260-615.00R.

Tornqvist, Bengt Wilhelm. Ship for combined load. 4,002,135, Cl. 114-72.000.

Torrington Company, The: *See—*
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Towmotor Corporation: *See—*
Jones, Francis L., 4,002,029.
Kroboth, Richard J., 4,002,256.
Wible, John E., 4,002,220.

Towndrow, Percy Edwin; and Vousden, James Bernard, to Smiths Industries Limited. Moving-coil electrical instruments with radially spaced annular air-gaps. 4,002,978, Cl. 324-150.000.

Toyo Soda Manufacturing Co., Ltd.: *See—*
Mabuchi, Shunsuke; Tsuzuki, Kenji; and Matsunaga, Hideaki, 4,002,692.

Toyoda, Eiji; Noguchi, Masaaki; Tanaka, Yukiyasu; Bunda, Tsuchio; and Sumiyoshi, Masaharu, to Toyota Jidosha Kogyo Kabushiki Kaisha. Diesel engine and method for improving the performance thereof. 4,002,151, Cl. 123-3.000.

Toyooka, Tadao: *See—*
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Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
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Shinohara, Hiroshi; Masunaga, Kunihiko; Kani, Masakatsu; and Umehara, Hidetomo, 4,002,150.
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Yamaguchi, Shunzo; Ozaki, Tadashi; Kida, Masashi; and Konomi, Toshiaki, 4,002,025.
Yoshida, Akio, 4,002,043.

Traverse, Charles E. Method and apparatus for aerobic sewage treatment. 4,002,561, Cl. 210-14.000.

Tremmel, Robert Arnold: *See—*
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Trepanier, Donald L., to Dow Chemical Company, The. Substituted-3-thio-1,2,4-triazines. 4,002,624, Cl. 260-248.0AS.

Trepanier, Donald L., to Dow Chemical Company, The. Substituted 1,2,4-triazine-3-methanamines. 4,002,625, Cl. 260-248.0AS.

Trewiler, Carl E., to General Electric Company. Postformable laminate. 4,002,790, Cl. 428-212.000.

Trienco, Inc.: *See—*
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Trommer, Gunter: *See—*
Fischer, Peter; Schmidt, Bruno; Langer, Rolf; and Trommer, Gunter, 4,002,016.

Tronel, Roger Philippe. Parameter display and alarm installation for motor-driven vehicles. 4,003,019, Cl. 340-52.00F.

Troonen, Hugo; Roelants, Piet; and Boon, Bernard, to Recherche et Industrie Therapeutiques (R.I.T.). 6-Aminopenicillanic acid derivative. 4,002,530, Cl. 195-36.00P.

Troster, Helmut: *See—*
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TRW Inc.: *See—*
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Hayden, Rodney, 4,003,011.
McKee, William H., 4,001,931.
Wieland, Howard N., Jr., 4,002,876.

Tsang, Frederick; and Chua, H. T., to Intel Corporation. Integrated circuit bipolar bootstrap driver. 4,002,931, Cl. 307-264.000.

Tsao, Utah, to Lummus Company, The. Recovery of nickel and cobalt carbonates from ammoniacal leach solutions. 4,002,719, Cl. 423-144.000.

Tschanz, Markus: *See—*
Meyr, Heini; Mey, Hansjurg; Nenadal, Zdenek; Tschanz, Markus; Vogel, Eberhard W.; and Hafner, Emanuel, 4,002,842.

Tsuchihashi, Genichi; and Ogura, Katsuyuki, to Sagami Chemical Research Center. Aromatic enaminosulfoxide derivatives. 4,002,682, Cl. 260-570.50S.

Tsuchihashi, Kiyoshi: *See—*
Inamoto, Yoshiaki; Ikeda, Hiroshi; Takaishi, Naotake; and Tsuchihashi, Kiyoshi, 4,002,674.
Inamoto, Yoshiaki; Ikeda, Hiroshi; Takaishi, Naotake; and Tsuchihashi, Kiyoshi, 4,002,690.

Tsukiyasu, Tadashi: *See—*
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Tsuzuki, Kenji: *See—*
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Tubbs, Howard A.; and Waltz, Donald M. Water flow actuated air charging device. 4,002,184, Cl. 137-211.000.

Tuflex AG: *See—*
Bucheli, Josef, 4,002,100.

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CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977	B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976	B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976	B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977	B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976	B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976	B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976	B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977	B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976	B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976	B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976	B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976	B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977	B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977	B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976	B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976	B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976	B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976	B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976	B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977	B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976	B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976	B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976	B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976	B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977	B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976	B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977	B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976	B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976	B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977	B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976	B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976	B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976	B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976	B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976	B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976	B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976	B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977	B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977	B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976	B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977	B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976	B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977	B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976	B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977	B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976	B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977	B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976	B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976	B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976	B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976	B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977	B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976	B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976	B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977	B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976	B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976	B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976	B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976	B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976	B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976	B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976	B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976	B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976	B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976	B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977	B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976	B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976	B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976	B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976	B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977	B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976	B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976	B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976	B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976	B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976	B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976	B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976	B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976	B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976	B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976	B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976	B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976	B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977	B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976	B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976	B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976	B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 197
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF JANUARY, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Atwater, William M., to Harriss-Conners Chevrolet, Inc. Drill-operated abrading tool. Re. 29,108, Cl. 51-170.0PT.

Carter, J. Warne, to Ciba-Geigy Corporation. Methods of forming a fiber reinforced pipe on an inflatable mandrel. Re. 29,112, Cl. 156-156.000.

Ciba-Geigy Corporation: *See*—
Carter, J. Warne, Re. 29,112.

Eastman Kodak Company: *See*—
Masseth, Thomas J., Re. 29,111.

Folberth, William M. Display rack for locksets. Re. 29,106, Cl. 35-49.000.

Halter, Jerome Barth, to RCA Corporation. Triangular piezoelectric transducer for recording video information. Re. 29,113, Cl. 358-128.000.

Harris Corporation: *See*—
Miaskoff, Leonard; and Reed, David A., Re. 29,105.

Harriss-Conners Chevrolet, Inc.: *See*—
Atwater, William M., Re. 29,108.

Imhoff, William B., to Leigh Products, Inc. Door coordinator. Re. 29,107, Cl. 49-366.000.

Leigh Products, Inc.: *See*—
Imhoff, William B., Re. 29,107.

Masseth, Thomas J., to Eastman Kodak Company. Photographic developer composition containing formaldehyde bisulfite alkanolamine condensation product and free alkanolamine. Re. 29,111, Cl. 96-66.400.

Miaskoff, Leonard; and Reed, David A., to Harris Corporation. Apparatus for making books. Re. 29,105, Cl. 11-3.000.

Oury, Robert F., to Rotec Industries, Inc. Boom mounted conveying means. Re. 29,110, Cl. 198-314.000.

Petersen, Hans-Gunther; and Requardt, Heiko, to Volkswagenwerk Aktiengesellschaft. Apparatus for the determination of internal combustion engine compression pressure. Re. 29,109, Cl. 73-117.200.

RCA Corporation: *See*—
Halter, Jerome Barth, Re. 29,113.

Reed, David A.: *See*—
Miaskoff, Leonard; and Reed, David A., Re. 29,105.

Requardt, Heiko: *See*—
Petersen, Hans-Gunther; and Requardt, Heiko, Re. 29,109.

Rotec Industries, Inc.: *See*—
Oury, Robert F., Re. 29,110.

Volkswagenwerk Aktiengesellschaft: *See*—
Petersen, Hans-Gunther; and Requardt, Heiko, Re. 29,109.

LIST OF PLANT PATENTEES

Larsen, Carl A. Lady uarda. 4,009, 1-11-77, Cl. 66.000.

LIST OF DESIGN PATENTEES

All Orthopedic Appliances, Inc.: *See*—
Spiro, Irving, 243,037.

American Hospital Supply Corporation: *See*—
Aul, Robert J.; Babington, Robert S.; Dunlap, Glenn H.; and Zitkus, Wayne J., 243,039.

American Optical Corporation: *See*—
Loughner, Larry G., 243,012.
Shindler, Anthony, 243,010.
Shindler, Anthony, 243,011.

Anderson, Dennis C., to National Polymers, Inc. Stackable flower pot. 243,031, 1-11-77, Cl. D11-152.000.

Anderson, Walter C., to General Electric Company. Looking glass or similar article. 243,041, 1-11-77, Cl. D86-10.00H.

Anziano, Robert C. Wind deflector for truck trailers. 243,001, 1-11-77, Cl. D12-181.000.

Associated Mills, Inc. an Illinois Corporation: *See*—
Grube, Clifford E., 243,040.

Aul, Robert J.; Babington, Robert S.; Dunlap, Glenn H.; and Zitkus, Wayne J., to American Hospital Supply Corporation. Nebulizer unit or similar article. 243,039, 1-11-77, Cl. D83-1.00N.

Babington, Robert S.: *See*—
Aul, Robert J.; Babington, Robert S.; Dunlap, Glenn H.; and Zitkus, Wayne J., 243,039.

Barr, Edward Wallace, Jr., to Briarpatch, Inc. Restaurant building. 243,018, 1-11-77, Cl. D25-22.000.

Bauer, Paul T.: *See*—
Servais, Ronald A.; and Bauer, Paul T., 242,996.

Becker, May. Covered basket. 242,989, 1-11-77, Cl. D9-246.000.

Benes, Vladimir. Candle holder. 243,033, 1-11-77, Cl. D48-2.000.

Bills, George W.; and Eull, Marvin J., to Graco Inc. Spray unit. 243,016, 1-11-77, Cl. D23-17.000.

Box, Theodor M. Display shelf. 242,965, 1-11-77, Cl. D6-85.000.

Briarpatch, Inc.: *See*—
Barr, Edward Wallace, Jr., 243,018.

Brynel Incorporated: *See*—
Glasberg, Edwin, 242,963.

C. F. Associates: *See*—
Cohen, Bernard, 242,970.

Carnes, Marvin T. Gooseneck trailer hitch converter. 243,000, 1-11-77, Cl. D12-162.000.

Carter, Roland P., to Lane Company, Inc., The. Table. 242,969, 1-11-77, Cl. D6-175.000.

Caudron, Claude, to S E B. Vertical grill. 242,978, 1-11-77, Cl. D7-110.000.

Certified Chemicals Incorporated a Delaware Corporation: *See*—
Fossella, Gregory F., 243,017.

Clowers, Earl R., to Singer Company, The. Adaptors for vacuum cleaners. 243,006, 1-11-77, Cl. D15-63.000.

Cohen, Bernard, to C. F. Associates. Photograph holder. 242,970, 1-11-77, Cl. D6-234.000.

Confer Plastics, Inc. a New York State corporation: *See*—
Confer, Raymond C., 243,019.

Confer, Raymond C., to Confer Plastics, Inc. a New York State corporation. Swimming pool ladder. 243,019, 1-11-77, Cl. D25-64.000.

Costa, Eugene F.: *See*—
Jones, Douglas F.; and Costa, Eugene F., 243,013.

Craig, Roger R. Adjustable strap wrench. 242,981, 1-11-77, Cl. D8-22.000.

Crew, Richard P. Boomerang. 243,029, 1-11-77, Cl. D34-15.0PP.

Daenen, Robert H. C. M., to Dart Industries Inc. Grater. 242,973, 1-11-77, Cl. D7-47.000.

Daher, Theodore G., to General Electric Company. Electric broiler grill or similar article. 242,975, 1-11-77, Cl. D7-88.000.

Dart Industries Inc.: *See*—
Daenen, Robert H. C. M., 242,973.
Haynes, Rodney R., Sr., 242,964.

Day, Evangeline. Bowl. 242,972, 1-11-77, Cl. D7-24.000.

Derderian, John S. Combined flint dispenser and screwdriver. 242,988, 1-11-77, Cl. D9-187.000.

Dixson, Tommy W. Accessory console for motorcycles. 242,997, 1-11-77, Cl. D12-114.000.

Dixson, Tommy W. Motorcycle accessory console. 242,998, 1-11-77, Cl. D12-114.000.

Dixson, Tommy W. Accessory console for motorcycles. 242,999, 1-11-77, Cl. D12-114.000.

Dunlap, Glenn H.: *See*—
Aul, Robert J.; Babington, Robert S.; Dunlap, Glenn H.; and Zitkus, Wayne J., 243,039.

Dynabrade, Inc.: *See—*
Flickenstein, Elwin H.; and Welsch, Walter N., 242,982.

Earth Clocks Incorporated, Minnesota Corporation: *See—*
Jorgenson, Donald H., 242,990.

Electromedics, Inc.: *See—*
Ray, Phillip E., 243,038.

Ernst Leitz GmbH: *See—*
Uellenberg, Hans-Kurt, 243,007.

Eull, Marvin J.: *See—*
Bills, George W.; and Eull, Marvin J., 243,016.

Fairchild Industries, Inc. a Maryland corporation: *See—*
Prokop, Constant, 242,994.

Federal Paper Board Company, Inc.: *See—*
Schlichter, John J., 242,971.

Fleming, Joseph T.: *See—*
McKenzie, Thomas J.; and Fleming, Joseph T., 242,991.

Flickenstein, Elwin H.; and Welsch, Walter N., to Dynabrade, Inc. Casing for grinder tools. 242,982, 1-11-77, Cl. D8-70.000.

Fossella, Gregory F., to Certified Chemicals Incorporated a Delaware Corporation. Container for air freshener. 243,017, 1-11-77, Cl. D23-150.000.

Foto-Quelle GmbH: *See—*
Schade, Hans-Ulrich, 243,009.

Fuller, Harrison P.; and Strauss, Howard, to Omega Precision Hand Tools, Inc. Utility blade. 242,980, 1-11-77, Cl. D8-20.000.

General Electric Company: *See—*
Anderson, Walter C., 243,041.
Daher, Theodore G., 242,975.

Glasberg, Edwin, to Brynel Incorporated. Hairbrush. 242,963, 1-11-77, Cl. D4-31.000.

Graco Inc.: *See—*
Bills, George W.; and Eull, Marvin J., 243,016.

Gross, Ronald John. Plant container. 243,030, 1-11-77, Cl. D11-152.000.

Grube, Clifford E., to Associated Mills, Inc. an Illinois Corporation. Hydrotherapy bath assembly. 243,040, 1-11-77, Cl. D83-1.00C.

Gulick, Louis E. Cabinet for holding neckties and accessories. 242,968, 1-11-77, Cl. D6-164.000.

Hamada, Masanori, to Matsushita Electric Industrial Co. Clock radio. 243,036, 1-11-77, Cl. D56-4.00B.

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Hodges, Dale R. Planter. 243,032, 1-11-77, Cl. D11-149.000.

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Walker, John F.; and Muse, Harold T., 243,021.
Walker, John F.; and Muse, Harold T., 243,022.

Inderwick, Anthony F. Paving block. 243,020, 1-11-77, Cl. D25-80.000.

Inglis, Ljot M. Curtain rod bracket. 242,986, 1-11-77, Cl. D8-239.000.

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International Silver Company (a Delaware corporation): *See—*
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Jones, Douglas F.; and Costa, Eugene F. Rolling straight edge. 243,013, 1-11-77, Cl. D19-37.000.

Jorgenson, Donald H., to Earth Clocks Incorporated, Minnesota Corporation. Wall clock. 242,990, 1-11-77, Cl. D10-20.000.

Kabushiki Kaisha Saikosha Seisakusho: *See—*
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Kohlenstein, Gerald H. Stage light. 243,035, 1-11-77, Cl. D48-20.00K.

Lackman, Michael. Belt buckle. 242,962, 1-11-77, Cl. D2-427.000.

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Loughner, Larry G., to American Optical Corporation. Pair of spectacles. 243,012, 1-11-77, Cl. D16-65.000.

MacMillan, Barbara D. Stringed instrument holder. 242,966, 1-11-77, Cl. D6-114.000.

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McCree, A. Gilbert. Building. 243,005, 1-11-77, Cl. D25-17.000.

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Muse, Harold T.: *See—*
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Walker, John F.; and Muse, Harold T., 243,022.

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Pablik, Peter, to Ring-Control Electronic-Handelsgesellschaft m.b.H. Combined transceiver and mounting bracket for use in intercom devices. 243,024, 1-11-77, Cl. D26-14.00K.

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Parker Pen Company, The: *See—*
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Parkins, Donald L. Combined key rack and container therefor. 242,967, 1-11-77, Cl. D6-157.000.

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Petty, Preston L. Hand grip. 242,984, 1-11-77, Cl. D8-138.000.

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Proctor, Richard I. Cycle exerciser. 243,028, 1-11-77, Cl. D34-5.00K.

Prokop, Constant, to Fairchild Industries, Inc. a Maryland corporation. Aircraft nose and inlet. 242,994, 1-11-77, Cl. D12-81.000.

Ray, Phillip E., to Electromedics, Inc. Electronic meter for determining human pulse rate from a fingertip. 243,038, 1-11-77, Cl. D83-1.00F.

Reppert, Merlyn R., to W. R. Grace & Co. Automobile wire wheel. 243,003, 1-11-77, Cl. D12-205.000.

Reppert, Merlyn Ralph, to W. R. Grace & Co. Wire wheel. 243,004, 1-11-77, Cl. D12-205.000.

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Pablik, Peter, 243,024.

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Ross, Corbett: *See—*
Ross, Charles Michael Corbett; and Ross, Corbett, 242,993.

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Rowenta-Werke, GmbH: *See—*
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S E B: *See—*
Caudron, Claude, 242,978.

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Schlichter, John J., to Federal Paper Board Company, Inc. Glass tumbler. 242,971, 1-11-77, Cl. D7-5.000.

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Shindler, Anthony, to American Optical Corporation. Pair of spectacles. 243,011, 1-11-77, Cl. D16-65.000.

Sickul, Joan B. Ashtray. 243,025, 1-11-77, Cl. D27-22.000.

Singer Company, The: *See—*
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Patla, Jacob W.; Smith, Wayne R.; Tinz, Wolfgang H.; and Smith, Craig A., 243,008.

Spiro, Irving, to All Orthopedic Appliances, Inc. Lumbo-sacral support. 243,037, 1-11-77, Cl. D83-1.00J.

Strauss, Howard: *See—*
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Stuetzer, Franz Alban, to Rowenta-Werke, GmbH. Lighter. 243,026, 1-11-77, Cl. D27-42.000.

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W. R. Grace & Co.: *See—*
Reppert, Merlyn R., 243,003.
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Walker, John F.; and Muse, Harold T., to Honeywell Inc. Recording instrument. 243,021, 1-11-77, Cl. D26-14.00C.

Walker, John F.; and Muse, Harold T., to Honeywell Inc. Recording instrument. 243,022, 1-11-77, Cl. D26-14.00C.

Weckman, Richard L., to Owens-Illinois, Inc. Bottle. 242,987, 1-11-77, Cl. D9-125.000.

Welsch, Walter N.: *See—*
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Aul, Robert J.; Babington, Robert S.; Dunlap, Glenn H.; and Zitkus, Wayne J., 243,039.

CLASSIFICATION OF PATENTS

ISSUED JANUARY 11, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

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CLASS 3

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1.913	4,001,897

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66	4,002,437

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179	4,001,991
251	4,001,992
376	4,001,993
400	4,001,994
460	4,001,995
509	4,001,996
521	4,001,997
608	4,001,998
693	4,001,999
729	4,002,000
731	4,002,001
743	4,002,002

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466	4,002,050

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88 R	4,002,060
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302	4,002,068
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422 GC	4,002,070
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462	4,002,076
503	4,002,077

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4,002,879
294 4,002,872
314 4,002,873
321 4,002,874

CLASS 201

1 4,002,533
6 4,002,534
9 4,002,535

CLASS 202

173 4,002,536
248 4,002,537

CLASS 203

10 4,002,538
34 4,002,539

CLASS 204

24 4,002,540
33 4,002,541
38 A 4,002,542
41 4,002,543
109 4,002,544
192 4,002,545
4,002,546
195 F 4,002,547
4,002,548
211 4,002,549
222 4,002,550
247 4,002,551
266 4,002,552
278 4,002,553

CLASS 206

5 4,002,232
45.34 4,002,233
205 4,002,234
219 4,002,235
371 4,002,237
408 4,002,238
484 4,002,239
577 4,002,236

CLASS 208

48 AA 4,002,554
80 4,002,555
107 4,002,556
120 4,002,557
188 4,002,558

CLASS 209

3 4,002,559
73 4,002,560

CLASS 210

14 4,002,561
22 R 4,002,562
23 H 4,002,563
38 R 4,002,564
60 4,002,565
169 4,002,566
333 R 4,002,567

CLASS 211

42 4,002,240
88 4,002,241

CLASS 212

8 R 4,002,242
56 4,002,243

CLASS 213

43 4,002,244

CLASS 214

1 BD 4,002,245
1 BH 4,002,246
1 P 4,002,248
1 QA 4,002,247
6 H 4,002,249
8 4,002,250
17 CA 4,002,251
83.32 4,002,252
147 G 4,002,253
300 4,002,254
305 4,002,255
731 4,002,256

CLASS 215

13 A 4,002,257
206 4,002,258
216 4,002,259
305 4,002,260

CLASS 219

10.55 B 4,002,875
69 G 4,002,885
98 4,002,876
121 LM 4,002,877
121 P 4,002,878
275 4,002,880
301 4,002,881
499 4,002,882
543 4,002,883
552 4,002,884

CLASS 220

80 4,002,261
271 4,002,262
378 4,002,263

CLASS 221

63 4,002,264
210 4,002,265
260 4,002,266

CLASS 222

1 4,002,267
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58 4,002,270
134 4,002,271
392 4,002,272
400.7 4,002,273
410 4,002,274
543 4,002,275

CLASS 223

111 4,002,276

CLASS 224

45 S 4,002,277

CLASS 226

1 4,002,278
2 4,002,279
171 4,002,280

CLASS 227

63 4,002,281

CLASS 228

4.5 4,002,282
112 4,002,283
115 4,002,284
141 A 4,002,285
174 4,002,286

CLASS 229

23 AB 4,002,287
39 R 4,002,288
44 R 4,002,289
69 4,002,290

CLASS 232

17 4,002,291

CLASS 235

61.11 D 4,002,887
61.12 N 4,002,888
4,002,889
61.7 R 4,002,886
151.12 4,002,891
151.3 4,002,890
156 4,002,892

CLASS 236

46 R 4,002,292

CLASS 239

11 4,002,293
104 4,002,294
230 4,002,295
4,002,296
429 4,002,297

CLASS 240

6.4 R 4,002,893
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60 4,002,895

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18 A 4,002,307
18 PW 4,002,305
18 R 4,002,306
66 4,002,308
71.8 4,002,309
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107.7 4,002,311

CLASS 244

40 R 4,002,312
118 R 4,002,313

CLASS 246

63 C 4,002,314

CLASS 248

24 4,002,315
119 S 4,002,316

CLASS 249

79 4,002,317

CLASS 250

199 4,002,896
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4,002,898
201 4,002,899
202 4,002,900
211 R 4,002,901
213 R 4,002,902
267 4,002,903
270 4,002,904
302 4,002,905
315 A 4,002,906
325 4,002,907
328 4,002,908
4,002,909
360 4,002,910
4,002,911
392 4,002,916
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431 4,002,918
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560 4,002,919

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282 4,002,319

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46.7 4,002,568
51.5 A 4,002,569
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171 4,002,573
188 4,002,574
411 R 4,002,575
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184 4,002,321

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29.6 S 4,002,590
29.6 WQ 4,002,589
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38 4,002,592
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47 EN 4,002,598
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406 4,002,656
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471 R 4,002,664
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593 R 4,002,684
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872 4,002,700
874 4,002,701
899 4,002,702
901 4,002,703

CLASS 261

23 A 4,002,704
98 4,002,705

CLASS 264

13 4,002,706
29.4 4,002,587
31 4,002,707
42 4,002,708
90 4,002,709
183 4,002,710
184 4,002,711
194 4,002,712
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250 4,002,714
4,002,715

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57.1 A 4,002,327

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CLASS 271

11 4,002,332

CLASS 272

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236 4,002,350
278 4,002,351
408 4,002,352
490 R 4,002,353
614 4,002,354

CLASS 281

29 4,002,355

CLASS 282

29 B 4,002,356

CLASS 285

61 4,002,357
137 R 4,002,358
331 4,002,359

CLASS 292

336.3 4,002,360
4,002,361

CLASS 293

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4,002,363
67 4,002,364

CLASS 294

8	4,002,365
26	4,002,366

CLASS 296

137 A	4,002,367

CLASS 297

273	4,002,368
445	4,002,369

CLASS 298

1 H	4,002,370

CLASS 301

9 TV	4,002,371

CLASS 302

25	4,002,372

CLASS 303

3	4,002,373
29	4,002,374
33	4,002,375
115	4,002,376

CLASS 307

17	4,002,920
43	4,002,921
88.3	4,002,922
116	4,002,923
117	4,002,924
141	4,002,925
225 C	4,002,926
246	4,002,927
251	4,002,928
252 W	4,002,929
262	4,002,930
264	4,002,931
265	4,002,932
291	4,002,933

CLASS 308

36.1	4,002,377
147	4,002,378
187	4,002,379
207 R	4,002,380

CLASS 310

8	4,002,934
27	4,002,935
166	4,002,936
168	4,002,937

CLASS 312

183	4,002,381
209	4,002,382
	4,002,383
284	4,002,384
286	4,002,385
320	4,002,386
350	4,002,387

CLASS 313

101	4,002,938
217	4,002,939
346 R	4,002,940
402	4,002,941

CLASS 314

60	4,002,942

CLASS 315

39	4,002,943
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58	4,002,945
169 TV	4,002,946

CLASS 317

12 A	4,002,947
13 A	4,002,948
15	4,002,949
16	4,002,950
18 D	4,002,951
66	4,002,952
101 DH	4,002,953
120	4,002,955
154	4,002,956
245	4,002,957

CLASS 318

117	4,002,954
227	4,002,958
245	4,002,959
257	4,002,960
305	4,002,961
329	4,002,962

CLASS 321

18	4,002,963

CLASS 323

16	4,002,964
17	4,002,965

CLASS 324

37	4,002,966
40	4,002,967
51	4,002,968
57 N	4,002,969
	4,002,970
	4,002,971
73 R	4,002,972
	4,002,973
	4,002,974
96	4,002,975
126	4,002,976
132	4,002,977
150	4,002,978
181	4,002,979

CLASS 325

3	4,002,980
32	4,002,825
38 R	4,002,981
39	4,002,982
54	4,002,983
392	4,002,984
455	4,002,985
459	4,002,986

CLASS 328

138	4,002,987
	4,002,988
	4,002,989
	4,002,990
139	4,002,991
181	4,002,992

CLASS 330

30 D	4,002,993
107	4,002,994

CLASS 331

1 A	4,002,995
65	4,002,996
94.5 C	4,002,998
94.5 H	4,002,997
113 A	4,002,999
117 R	4,003,000

CLASS 332

1	4,003,001
10	4,003,002
11 R	4,003,003
30 V	4,003,004

CLASS 333

8	4,003,005
16	4,003,006
20	4,003,007
70 T	4,003,008

CLASS 334

15	4,003,009

CLASS 335

190	4,003,010
196	4,003,011
213	4,003,012
220	4,003,013

CLASS 338

326	4,003,014

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22 B	4,002,388
50 C	4,002,394
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221 M	4,002,399
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CLASS 340

3 R	4,003,015
6 R	4,003,016
15	4,003,018
15.5 BH	4,003,017
52 F	4,003,019
146.1 AL	4,003,020
146.3 AG	4,003,021
146.3 H	4,003,024
146.3 MA	4,003,022
146.3 S	4,003,025
146.3 SG	4,003,023
149 A	4,003,026
172.5	4,003,027
	4,003,028
	4,003,029
	4,003,030
	4,003,031
	4,003,032
	4,003,033
173 CA	4,003,034
173 FF	4,003,035
173 R	4,003,036
174 TF	4,003,037
227 D	4,003,038
228 R	4,003,039
253 C	4,003,044
258 A	4,003,045
271	4,003,046
274 R	4,003,047
280	4,003,048
332	4,003,040
347 DD	4,003,041
	4,003,042
403	4,003,043

CLASS 343

5 SC	4,002,827
6 R	4,003,049
7.3	4,003,050
7.7	4,003,051
	4,003,052
14	4,003,053
17.7	4,003,054
	4,003,055
113 PT	4,003,060
704	4,003,056
713	4,003,057

CLASS 346

1	4,003,058
108	4,003,059

CLASS 350

4	4,002,401
58	4,002,402
160 LC	4,002,404
160 R	4,002,403
187	4,002,405
189	4,002,406
229	4,002,407

CLASS 353

70	4,002,408

CLASS 354

4	4,003,061
21	4,003,062
50	4,003,063
88	4,003,064
132	4,003,065
156	4,003,066
235	4,003,067
286	4,003,068
299	4,003,069
322	4,003,070

CLASS 356

31	4,002,410

CLASS 357

2	4,003,075
34	4,003,076
42	4,003,071
52	4,003,072
70	4,003,073
74	4,003,074

CLASS 358

4	4,003,077
22	4,003,078
31	4,003,079
63	4,003,080
64	4,003,081
69	4,003,082
106	4,002,823
128	Re.29,113
	4,002,826
180	4,002,824
240	4,002,828
254	4,002,831
286	4,002,829
293	4,002,830

CLASS 360

29	4,003,083
31	4,003,084
40	4,003,085
53	4,003,086
60	4,003,087
	4,003,088
	4,003,089
63	4,003,090
70	4,003,091
102	4,003,092
137	4,003,093

CLASS 401

213	4,002,411

CLASS 403

234	4,002,413

CLASS 404

17	4,002,412

CLASS 416

223 A	4,002,414

CLASS 417

245	4,002,415
330	4,002,416

CLASS 423

10	4,002,716
24	4,002,717
144	4,002,719
230	4,002,720
232	4,002,721
238	4,002,722
239	4,002,723
242	4,002,724
263	4,002,725
287	4,002,726
573 R	4,002,727
578 R	4,002,728
579	4,002,729

CLASS 424

1	4,002,730
5	4,002,731
37	4,002,718
49	4,002,732
59	4,002,733
74	4,002,734
92	4,002,736
94	4,002,737
177	4,002,738
	4,002,739
	4,002,740
180	4,002,741
	4,002,742
200	4,002,743
219	4,002,744
230	4,002,745
243	4,002,746
	4,002,747
246	4,002,748
	4,002,749
250	4,002,750
	4,002,751
	4,002,752
	4,002,753
	4,002,754
251	4,002,755
253	4,002,756
258	4,002,757
263	4,002,758
	4,002,759
	4,002,760
	4,002,761
266	4,002,762
269	4,002,763
	4,002,764
273	4,002,765
274	4,002,766
322	4,002,767
337	4,002,768
339	4,002,769

CLASS 425

385	4,002,417
425	4,002,418

CLASS 426

72	4,002,770
103	4,002,771
281	4,002,772
302	4,002,773
484	4,002,774
532	4,002,775

CLASS 427

19	4,002,776
27	4,002,777
78	4,002,735
98	4,002,778
124	4,002,779
209	4,002,780
335	4,002,783
340	4,002,781
345	4,002,782
385 R	4,002,784
389	4,002,785
430 A	4,002,786

CLASS 428

35	4,002,787
70	4,002,788
108	4,002,789
212	4,002,790
260	4,002,791
310	4,002,792
352	4,002,794
370	4,002,795
375	4,002,796
378	4,002,797
419	4,002,798
428	4,002,799
447	4,002,800
474	4,002,801
483	4,002,802
539	4,002,803
	4,002,804

CLASS 429

17	4,002,805
26	4,002,493
53	4,002,496
87	4,002,495
89	4,002,494
104	4,002,806
	4,002,807
157	4,002,808
194	4,002,492

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67	4,002,419

CLASS 432

14	4,002,420
19	4,002,421
99	4,002,422

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4	4,002,809
22	4,002,810
59	4,002,811
	4,002,812
61	4,002,813
154	4,002,814
283	4,002,815

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119	4,002,609

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	114	242,966
	157	242,967
	164	242,968
	175	242,969
	234	242,970
D7—	5	242,971
	24	242,972
	47	242,973
	76	242,974
	88	242,975
	100	242,976
		242,977
	110	242,978
	137	242,979
D8—	20	242,980
	22	242,981
	70	242,982
	113	242,983
	138	242,984
	203	242,985
	239	242,986
D9—	125	242,987
	187	242,988
	246	242,989
D10—	20	242,990
	79	242,991
	106	242,992
D11—	149	243,032
	152	243,030
		243,031
D12—	62	242,993
	81	242,994
	96	242,995
	97	242,996
	114	242,997
		242,998
		242,999
	162	243,000
	181	243,001
	191	243,002
	205	243,003
		243,004
D15—	63	243,006
D16—	6 S	243,010
	8	243,007
	30	243,008
	42	243,009
	65	243,011
		243,012
D19—	37	243,013
	47	243,014
	28	243,015
D22—	17	243,016
D23—	150	243,017
	17	243,005
D25—	22	243,018
	64	243,019
	80	243,020
D26—	14 C	243,021
		243,022
	14 G	243,023
	14 K	243,024
D27—	22	243,025
	42	243,026
D30—	12	243,027
D34—	5 K	243,028
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	16 D	243,034
	20 K	243,035
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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

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DESIGN PATENTS

4	:	242,989		243,013		242,988		243,016		243,019	42 : 242,970
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5	:	243,015		242,979	25	: 243,010		242,972		242,977	47 : 243,034
6	:	242,966		242,991		243,011	36	: 242,961		242,987	48 : 243,032
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		242,986		243,041		243,017		242,980		242,996	242,969
		243,001	12	: 243,005	26	: 243,027		242,982		243,039	53 : 243,033
		243,002		243,037		243,035		242,994	40	: 243,000	55 : 242,974
		243,003	15	: 243,029	27	: 242,968		243,008	41	: 242,984	243,014
		243,004	17	: 242,985		242,990					

PLANT PATENTS

49	:	4,009									

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

U.S. DEPARTMENT OF COMMERCE

Elliot L. Richardson, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, Commissioner